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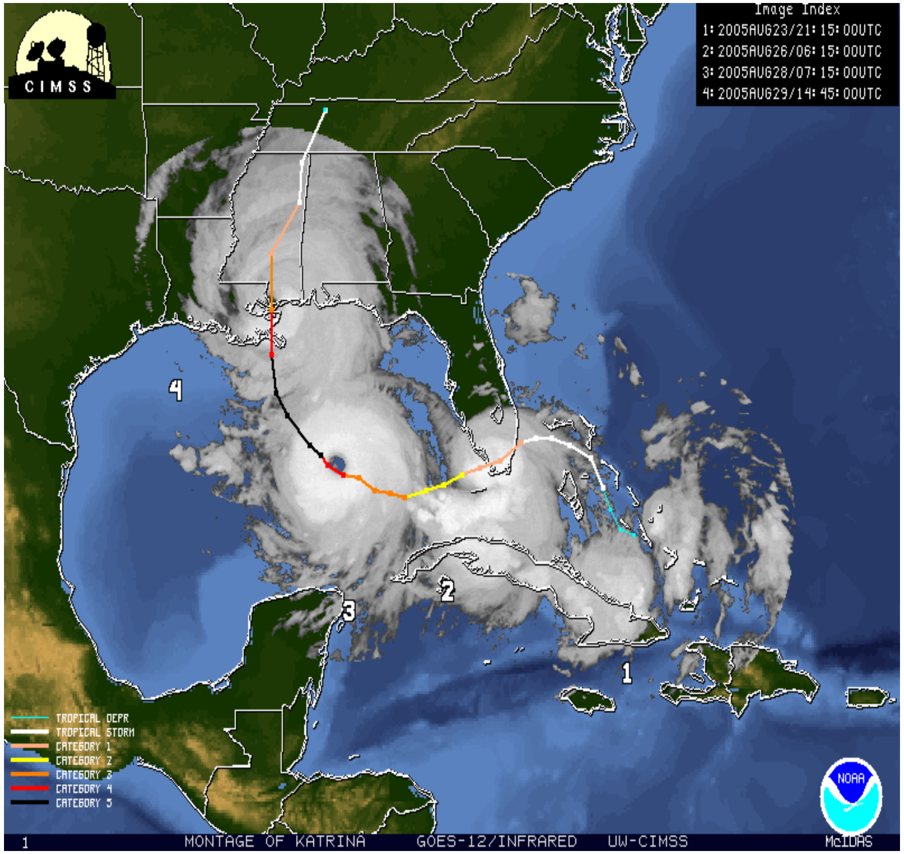
# HQUSACE Overview on Systems Approach

**Zoltan L. Montvai, P.E.**
**Deputy Chief, Mississippi Valley Division**
**Regional Integration Team**

**April 2, 2008**

# STORMS KNOW NO BOUNDARIES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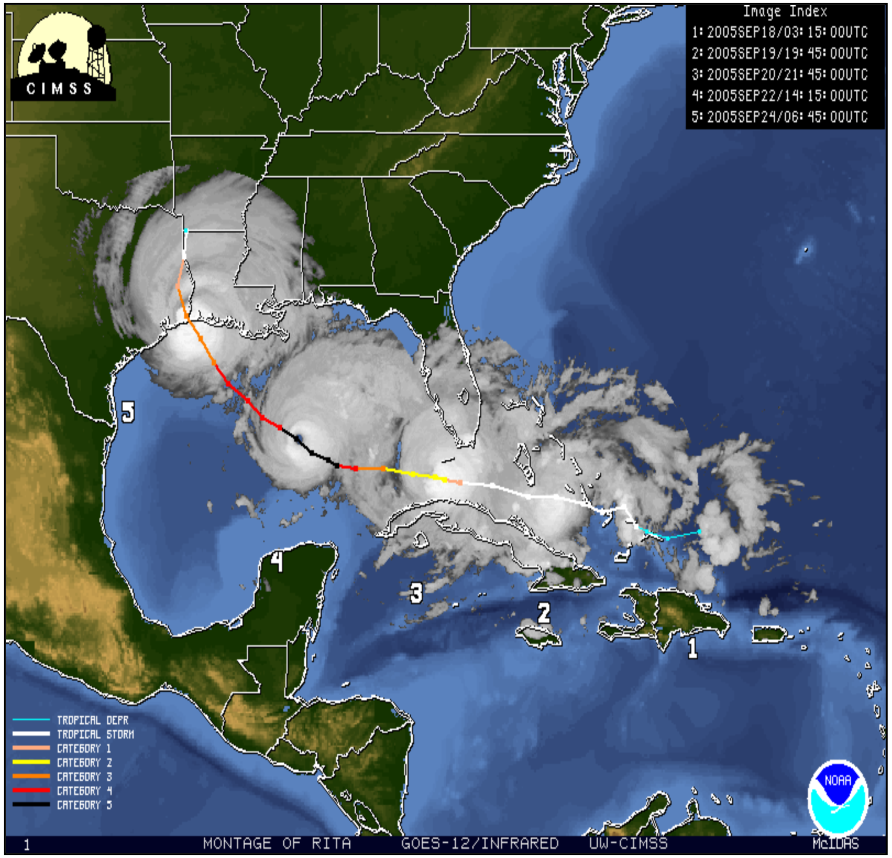
TROPICAL DEPR
TROPICAL STORM
CATEGORY 1
CATEGORY 2
CATEGORY 3
CATEGORY 4
CATEGORY 5
NOAA
1 MONTAGE OF KATRINA GOES-12/INFRARED UW-CIMSS McIDAS

Katrina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TROPICAL DEPR
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CATEGORY 3
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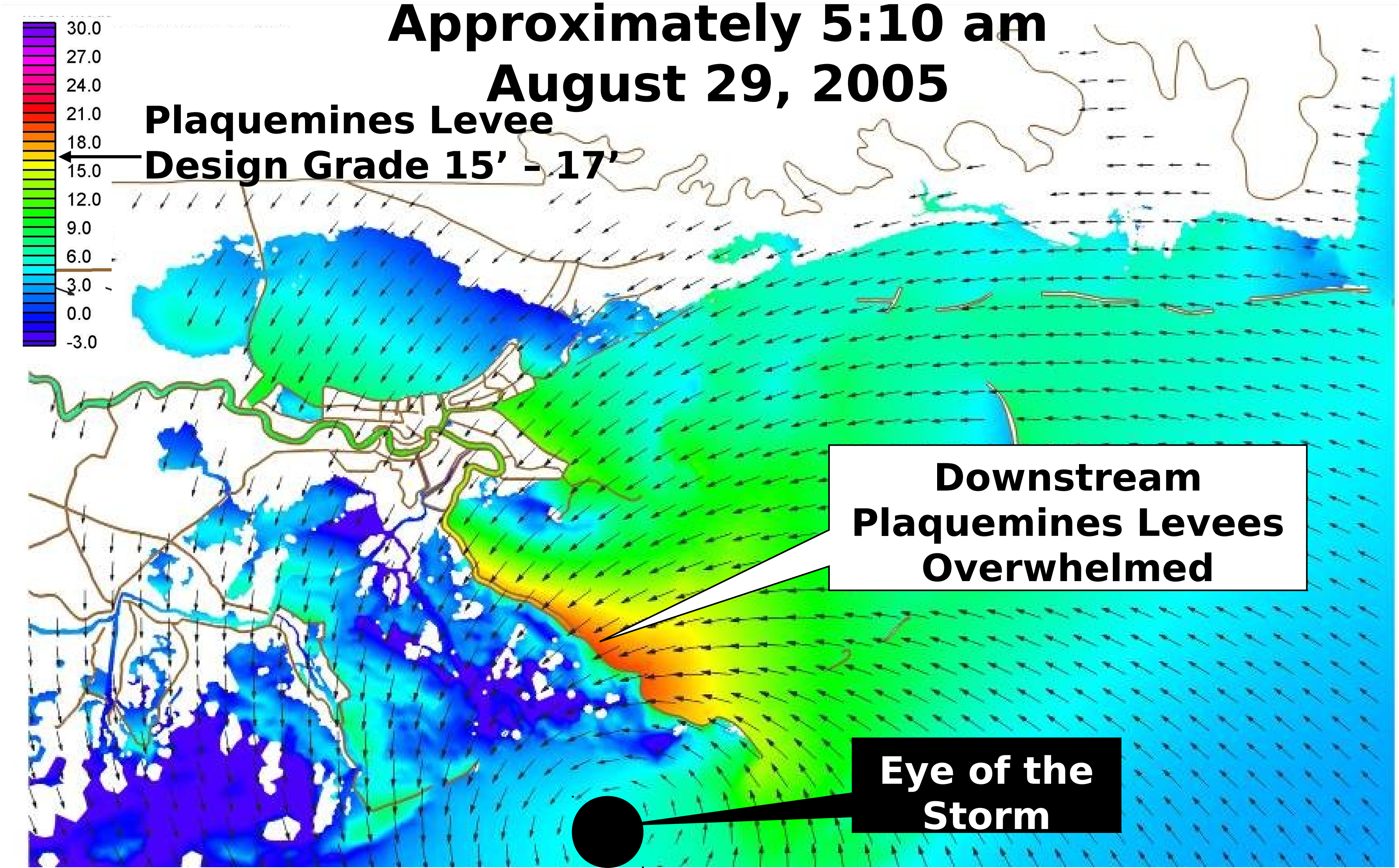
1 MONTAGE OF RITA GOES-12/INFRARED UW-CIMSS McIDAS

Rita

# Approximately 5:10 am August 29, 2005

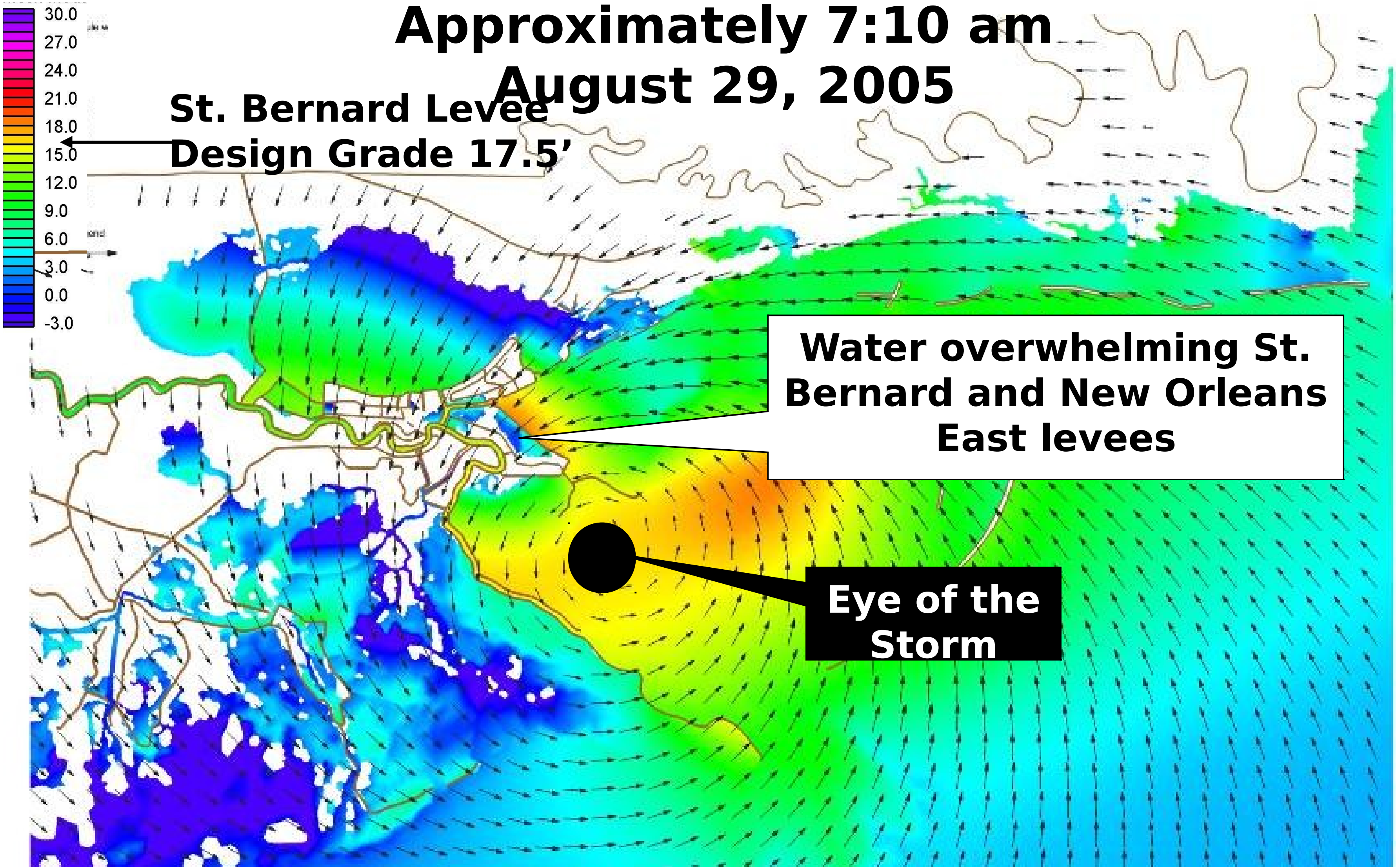


**Plaquemines Levee Design Grade 15’ – 17’**

**Downstream Plaquemines Levees Overwhelmed**

**Eye of the Storm**

# Approximately 7:10 am August 29, 2005

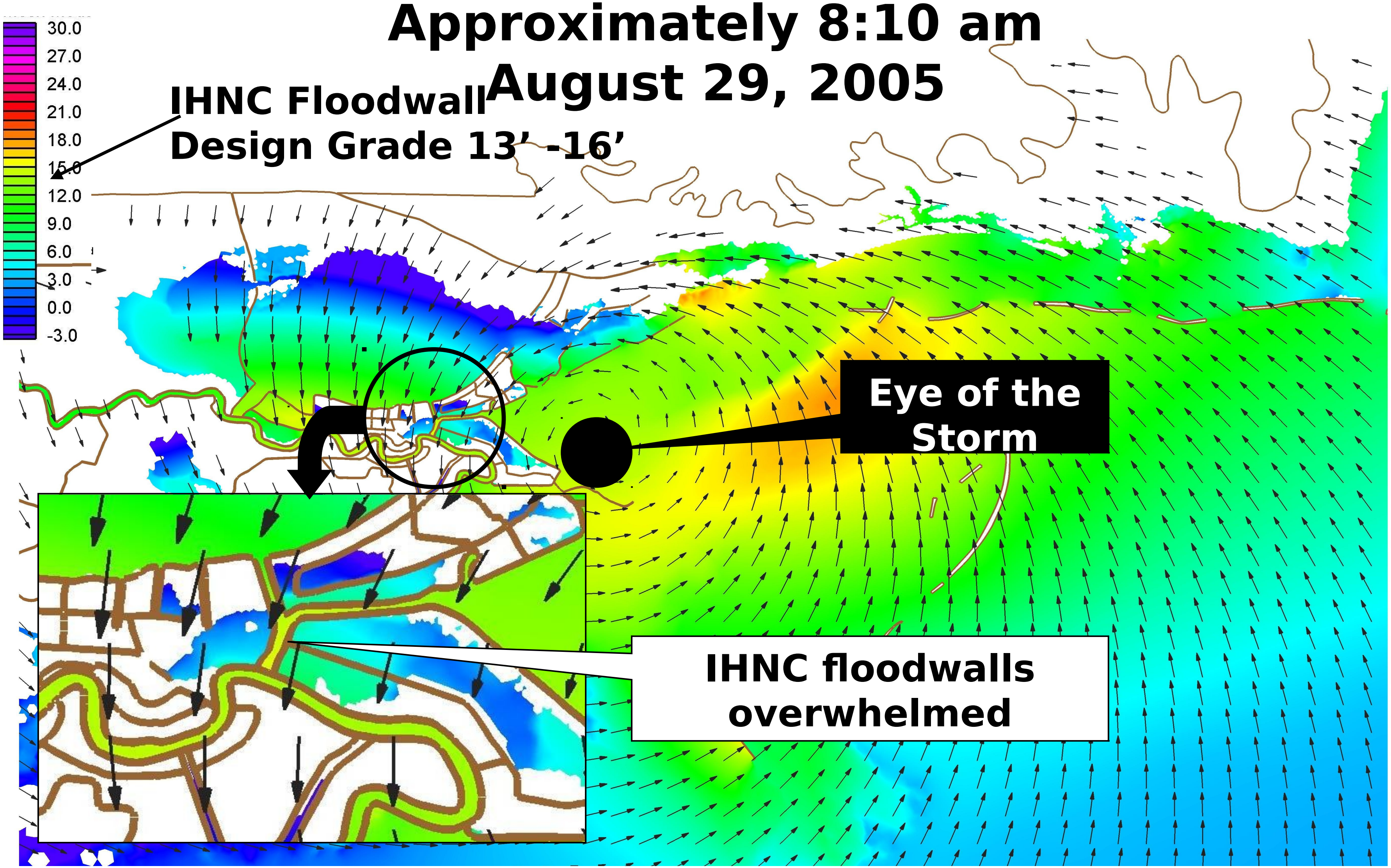


**St. Bernard Levee Design Grade 17.5’**

**Water overwhelming St. Bernard and New Orleans East levees**

**Eye of the Storm**

# Approximately 8:10 am August 29, 2005

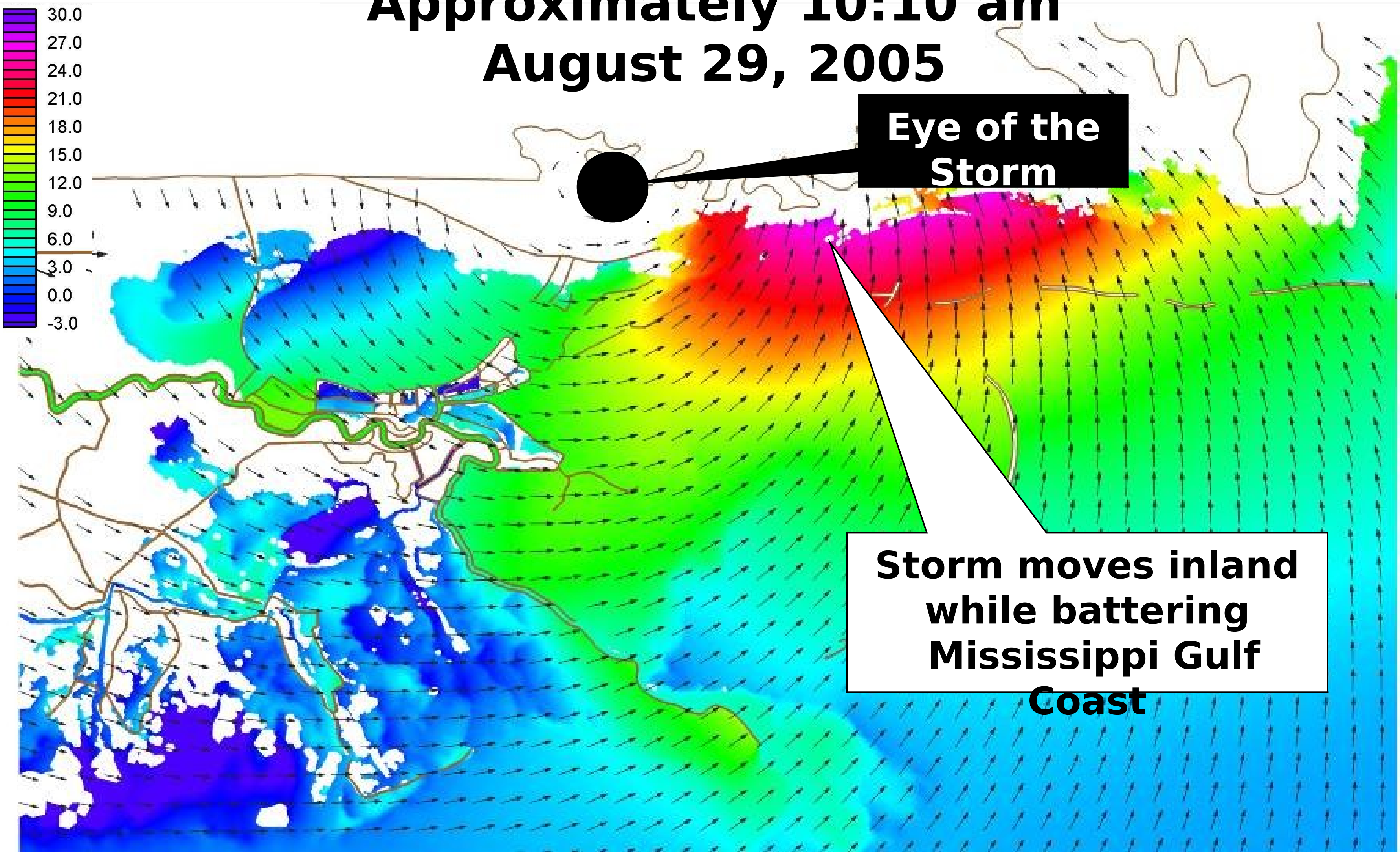


**IHNC Floodwall Design Grade 13’ -16’**

**Eye of the Storm**

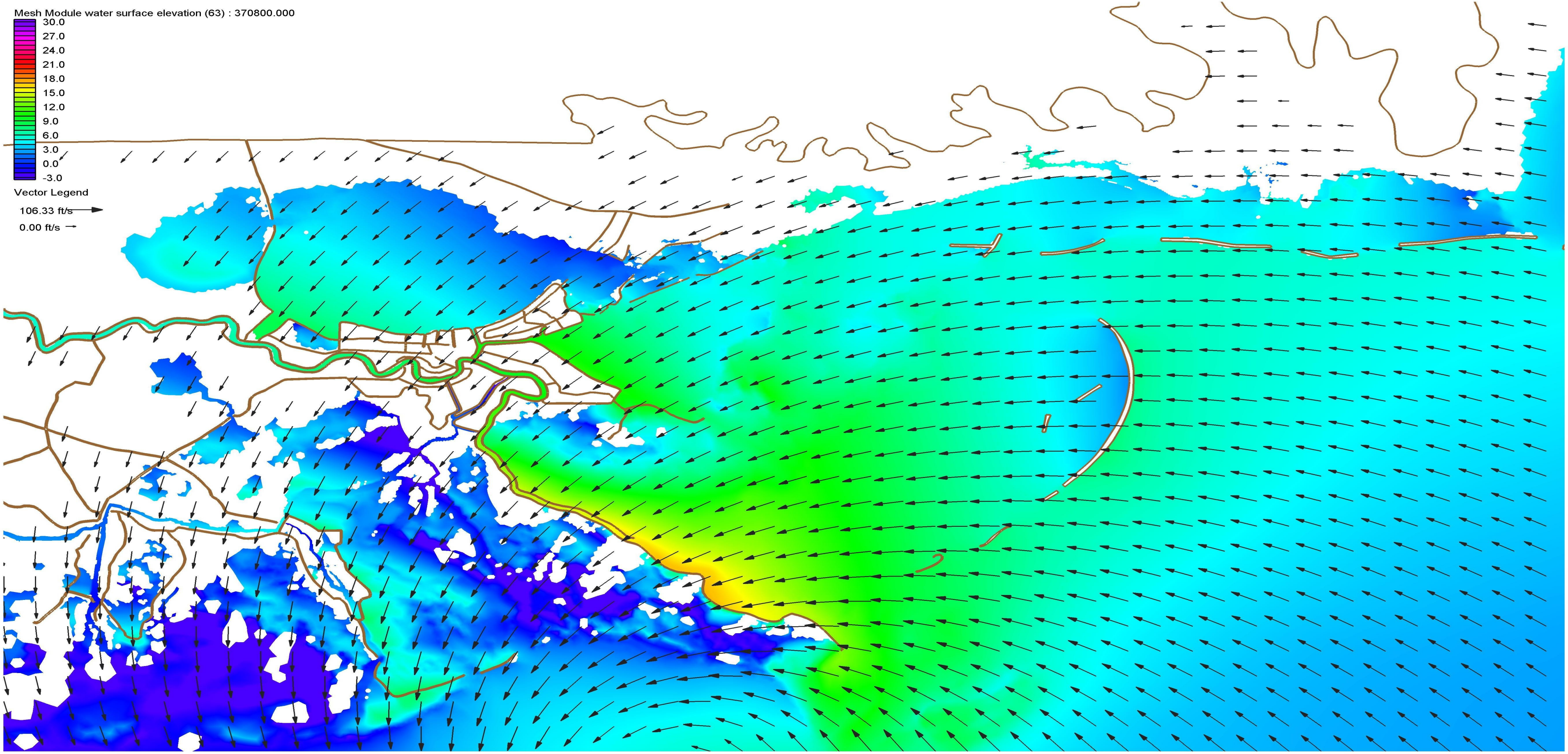
**IHNC floodwalls overwhelmed**

# Approximately 10:10 am August 29, 2005



Eye of the Storm

Storm moves inland while battering Mississippi Gulf Coast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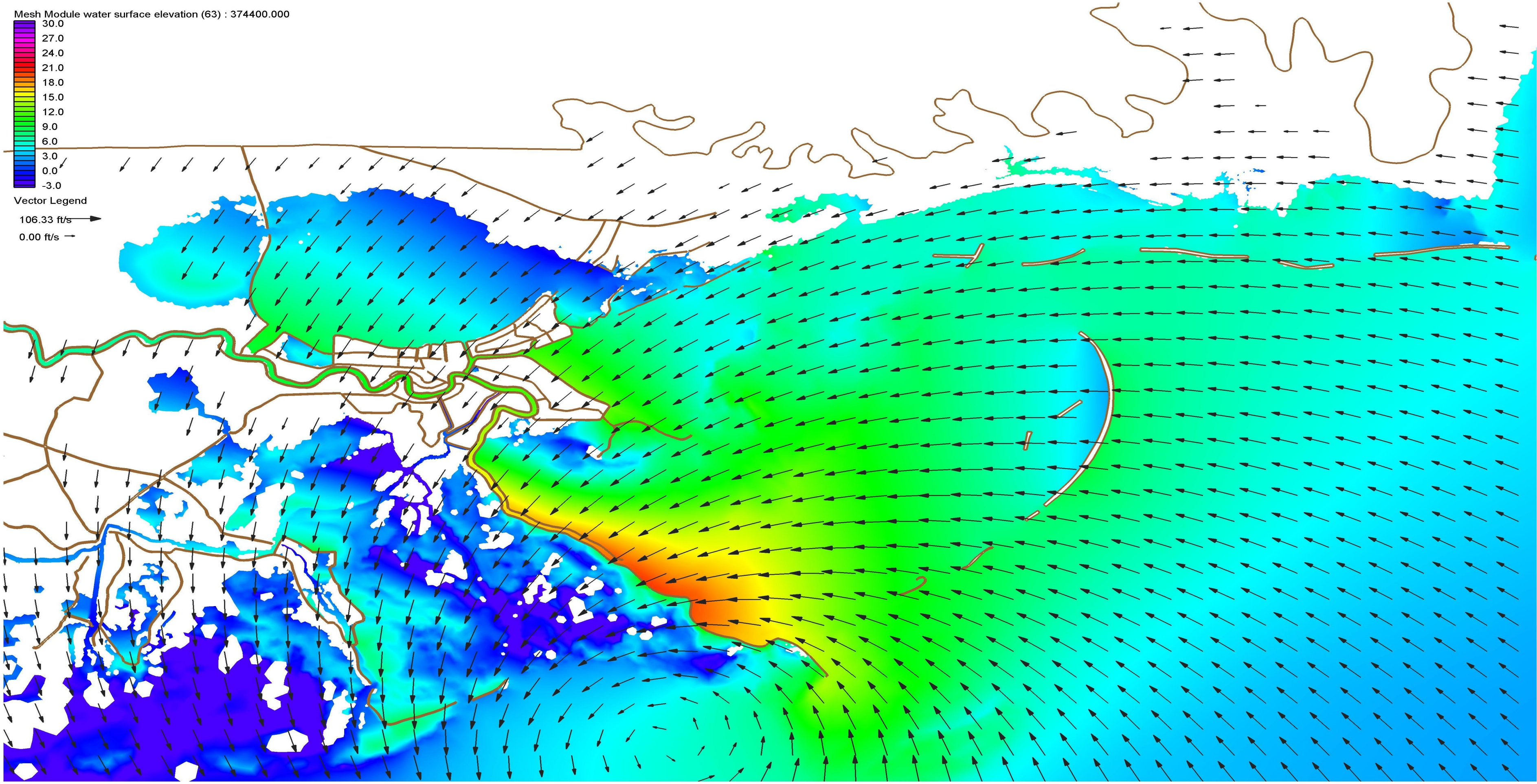
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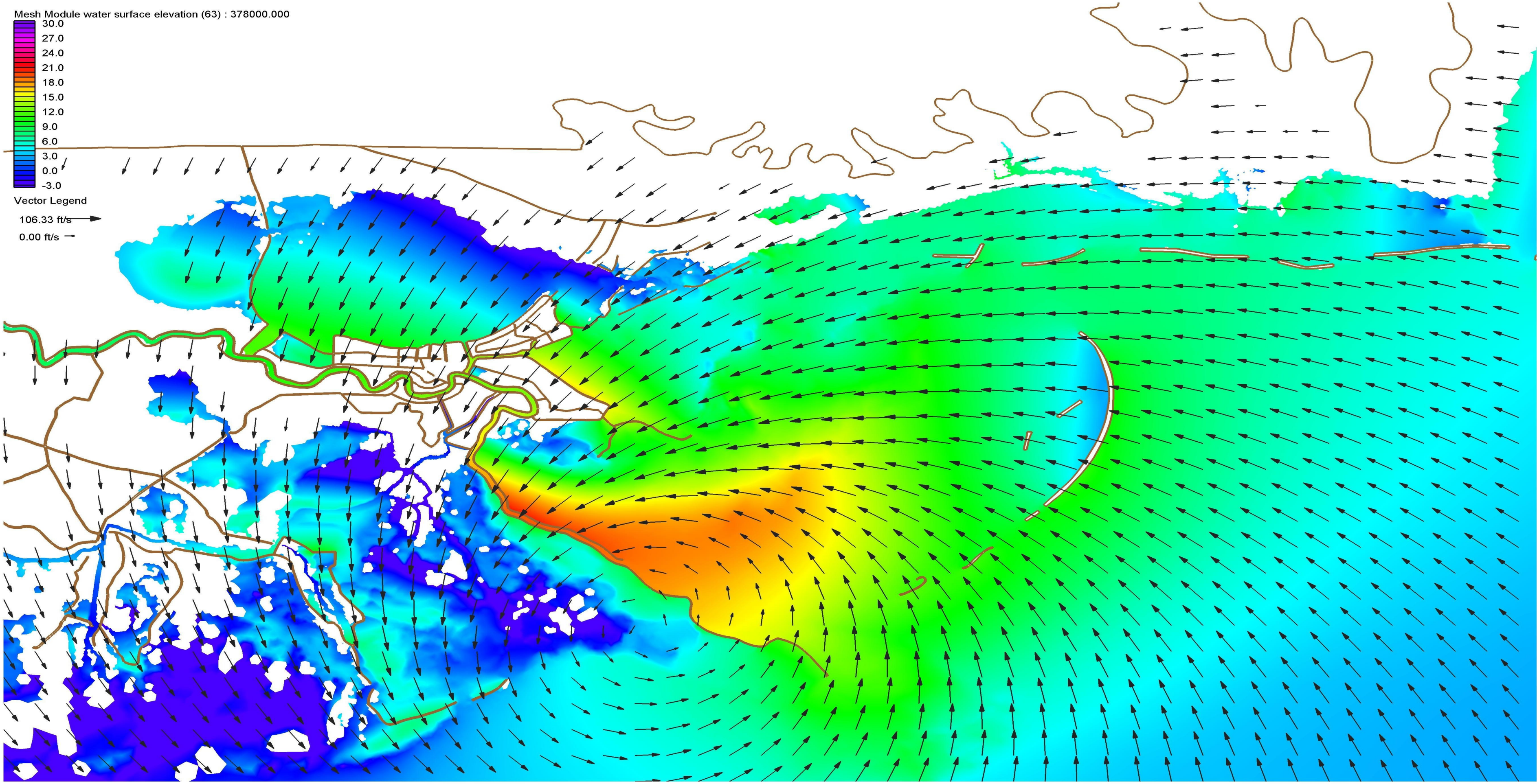
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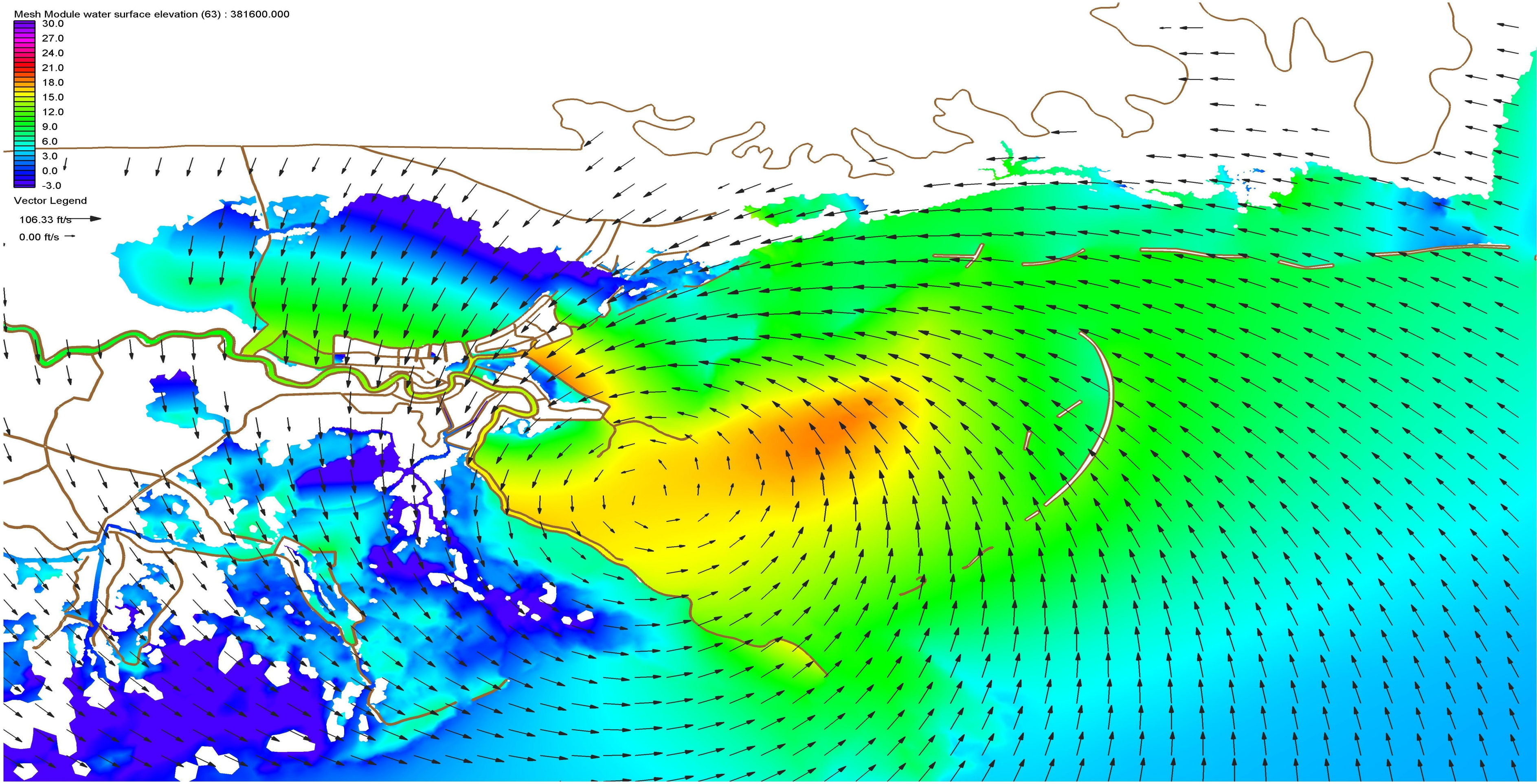
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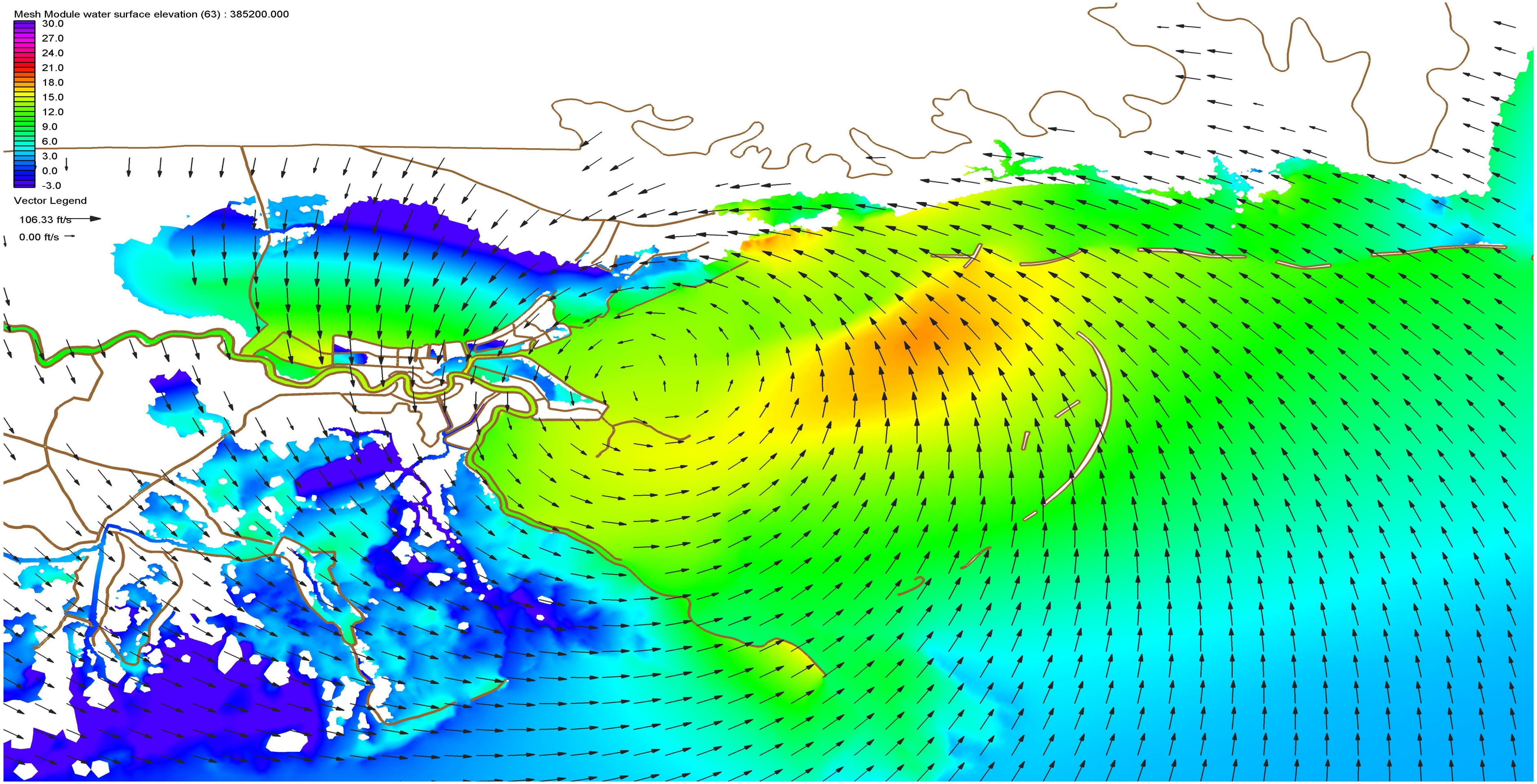
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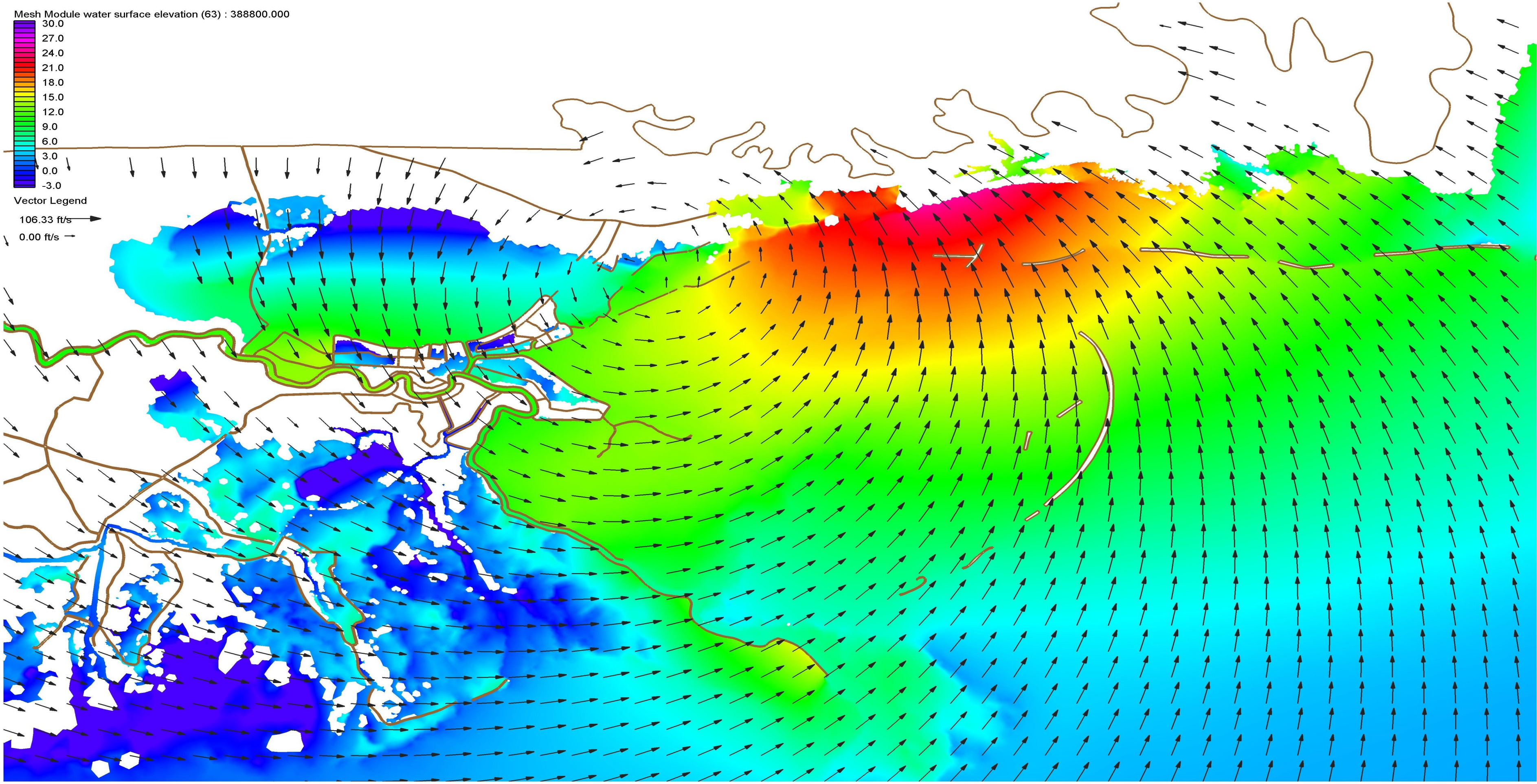
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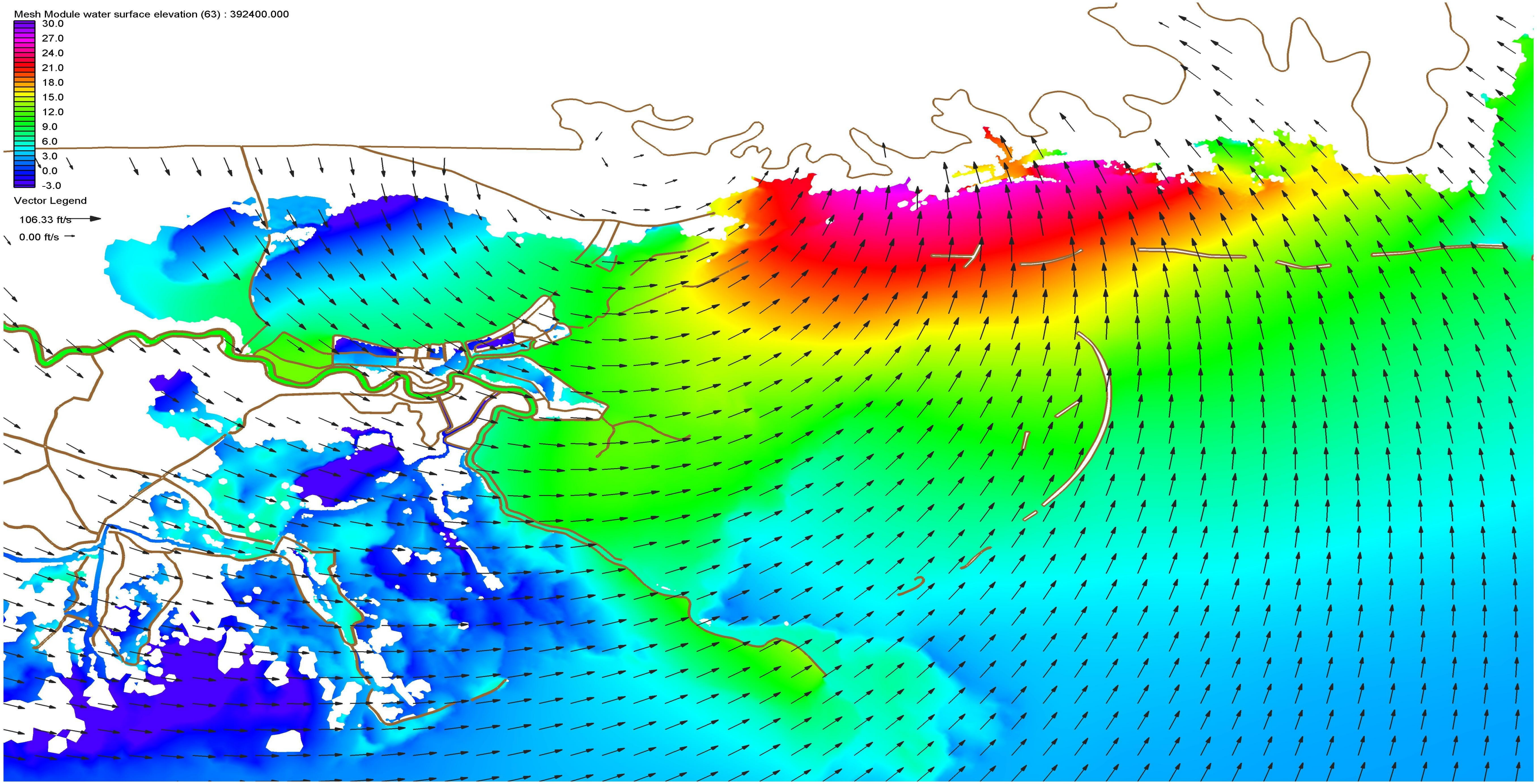
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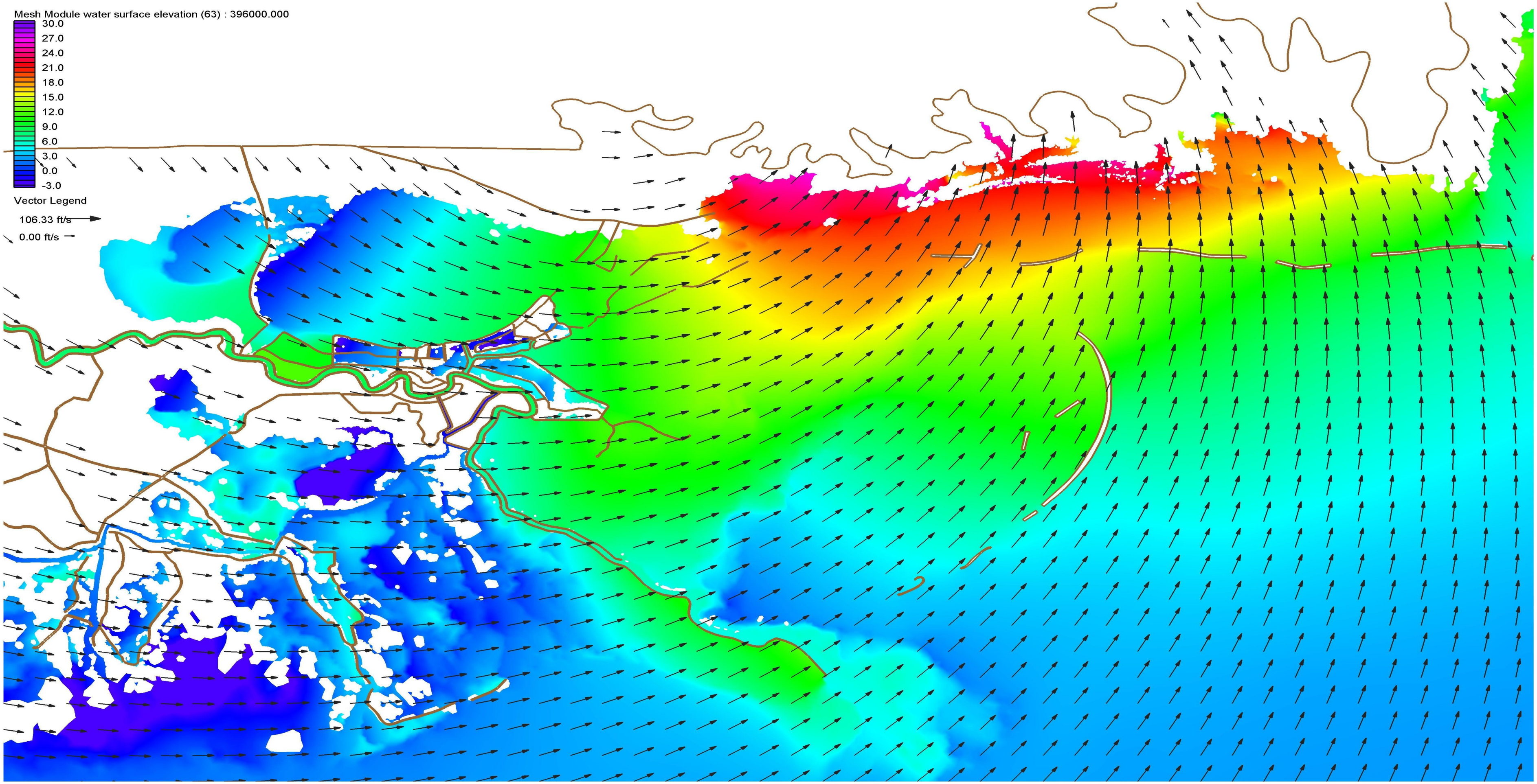
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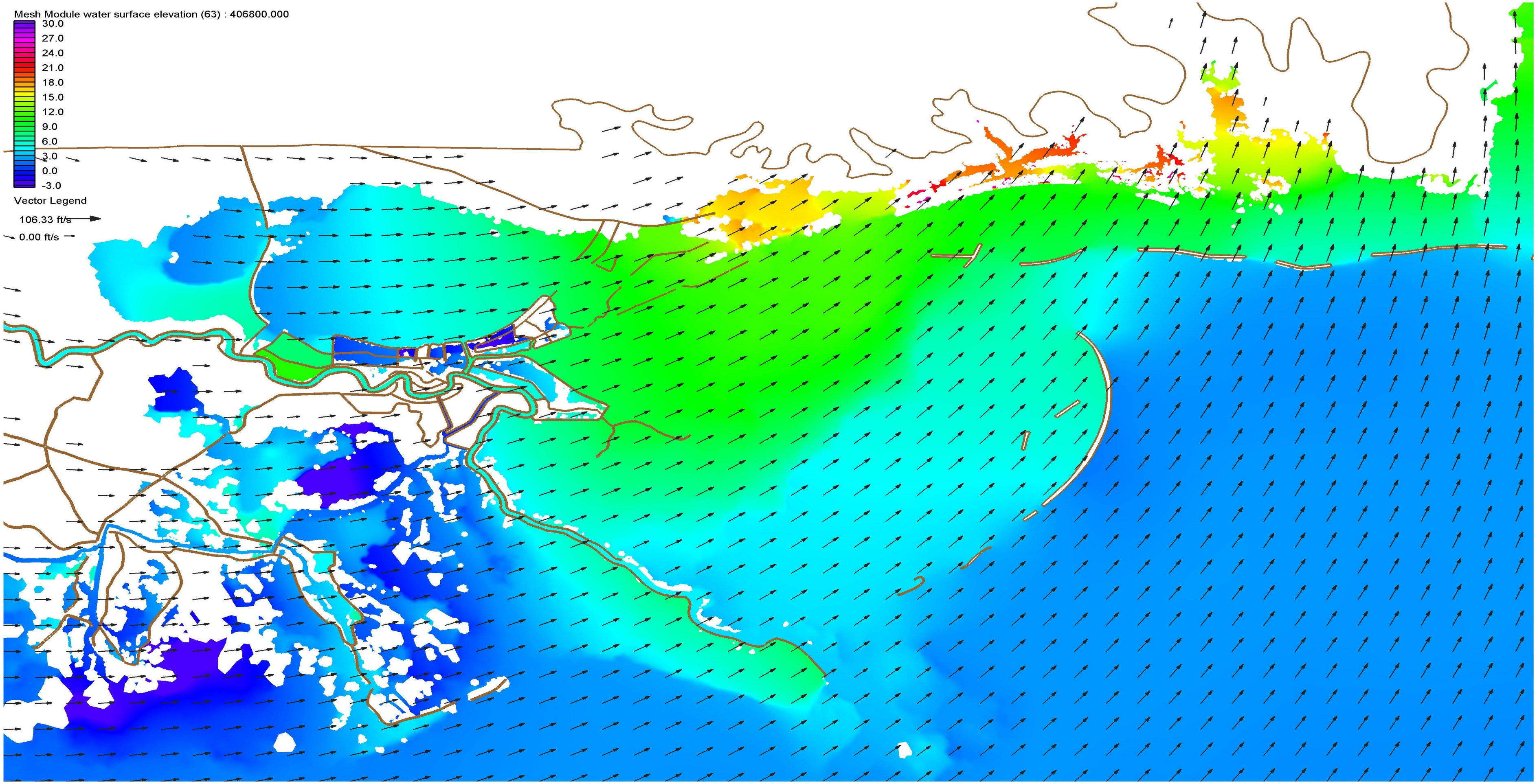
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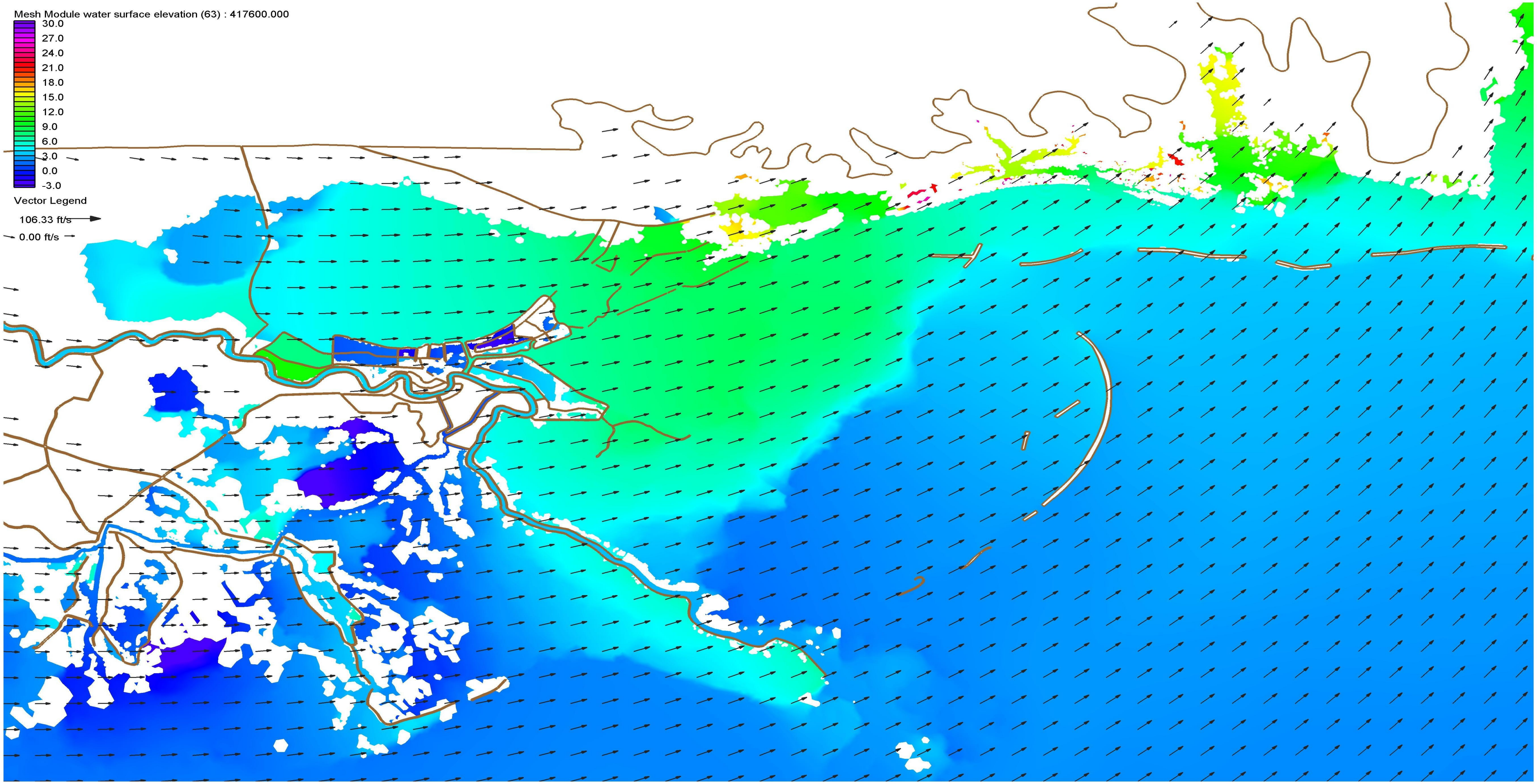
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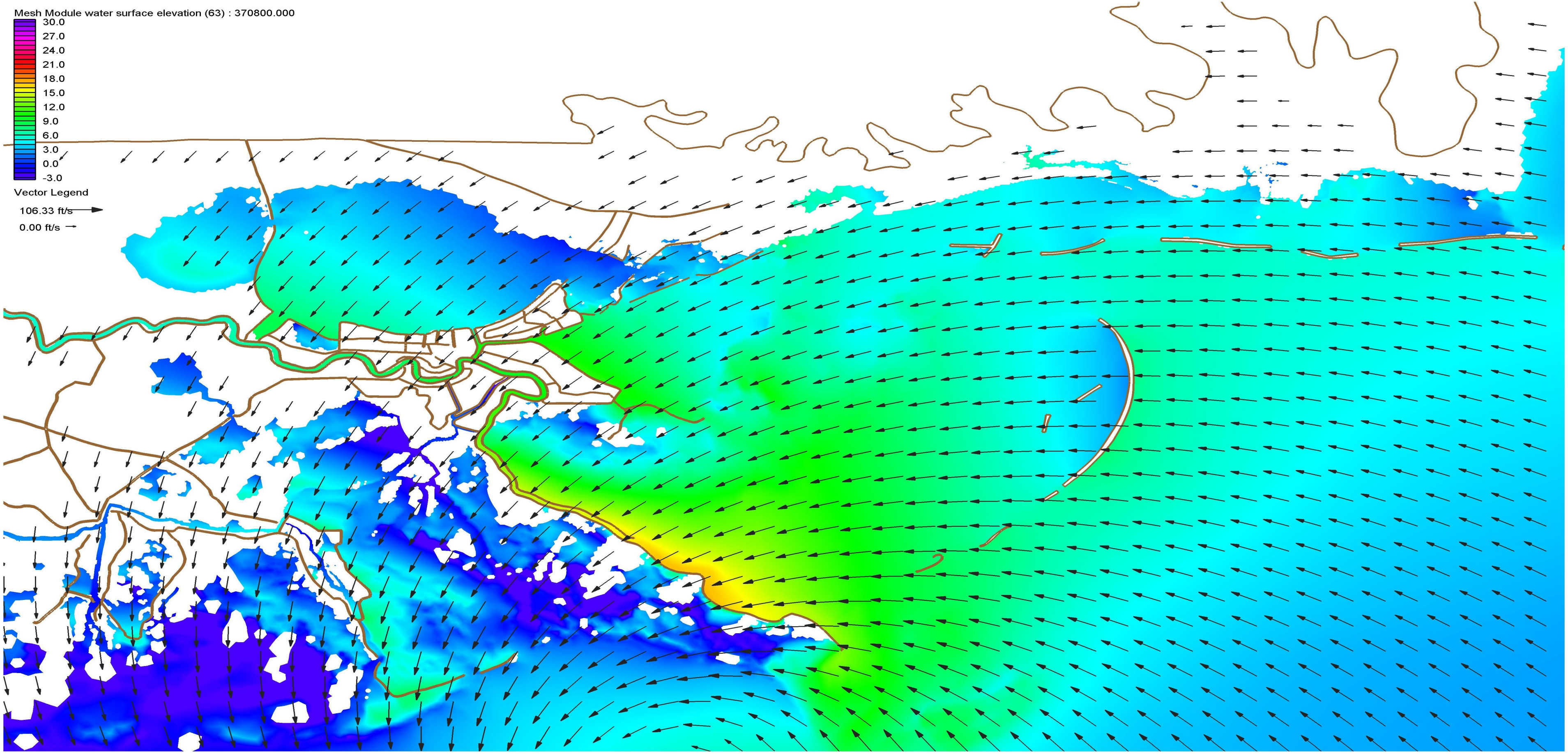
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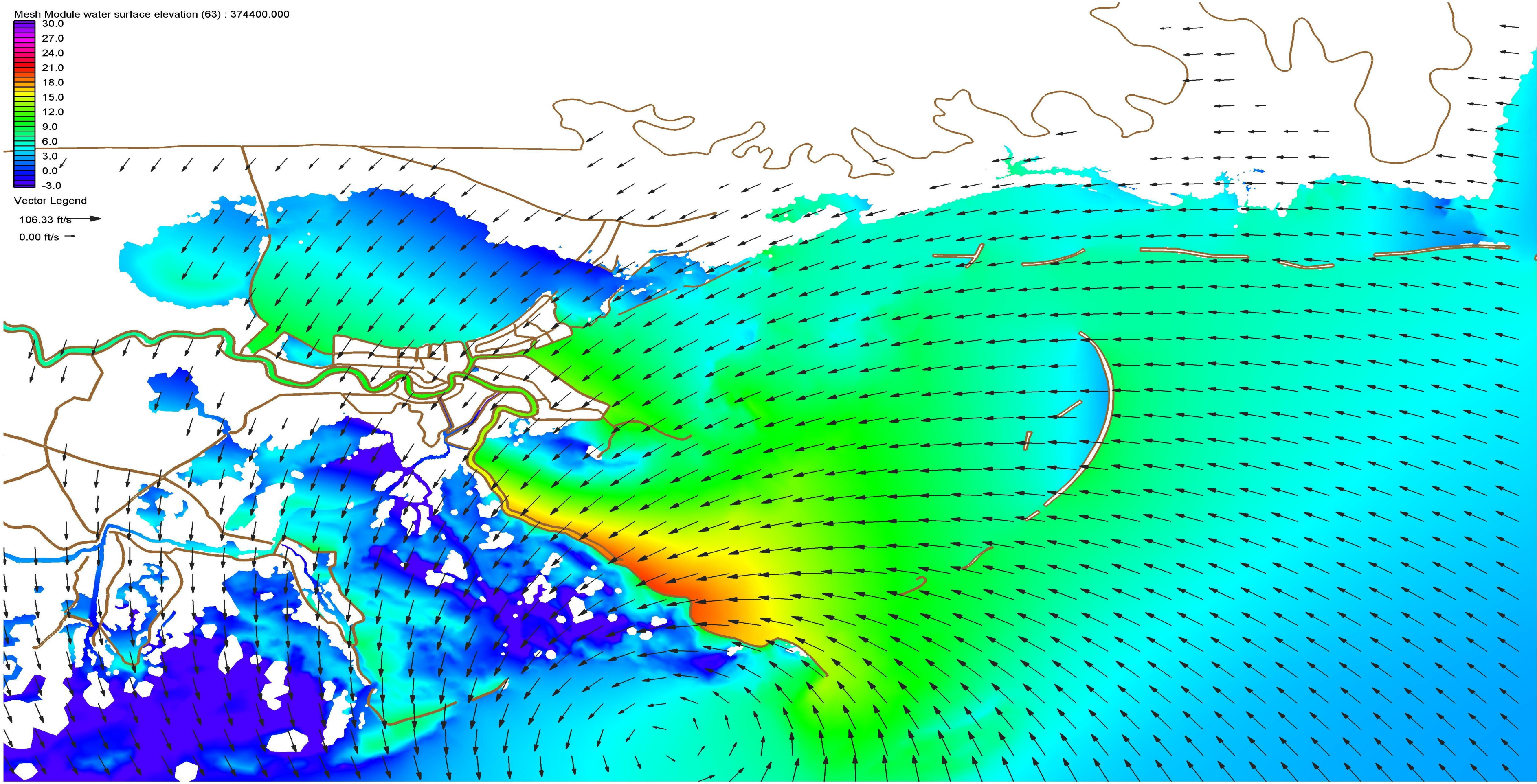
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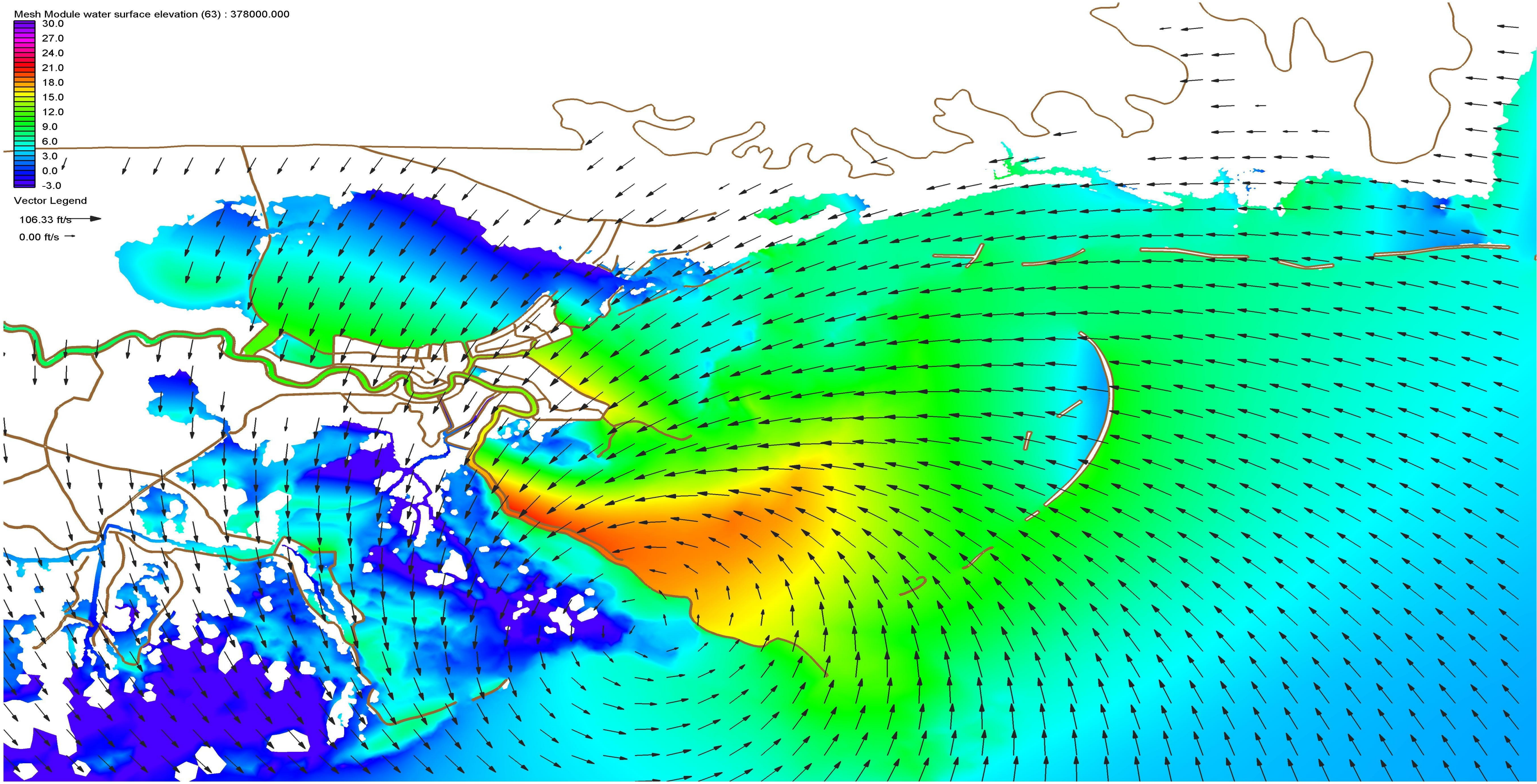
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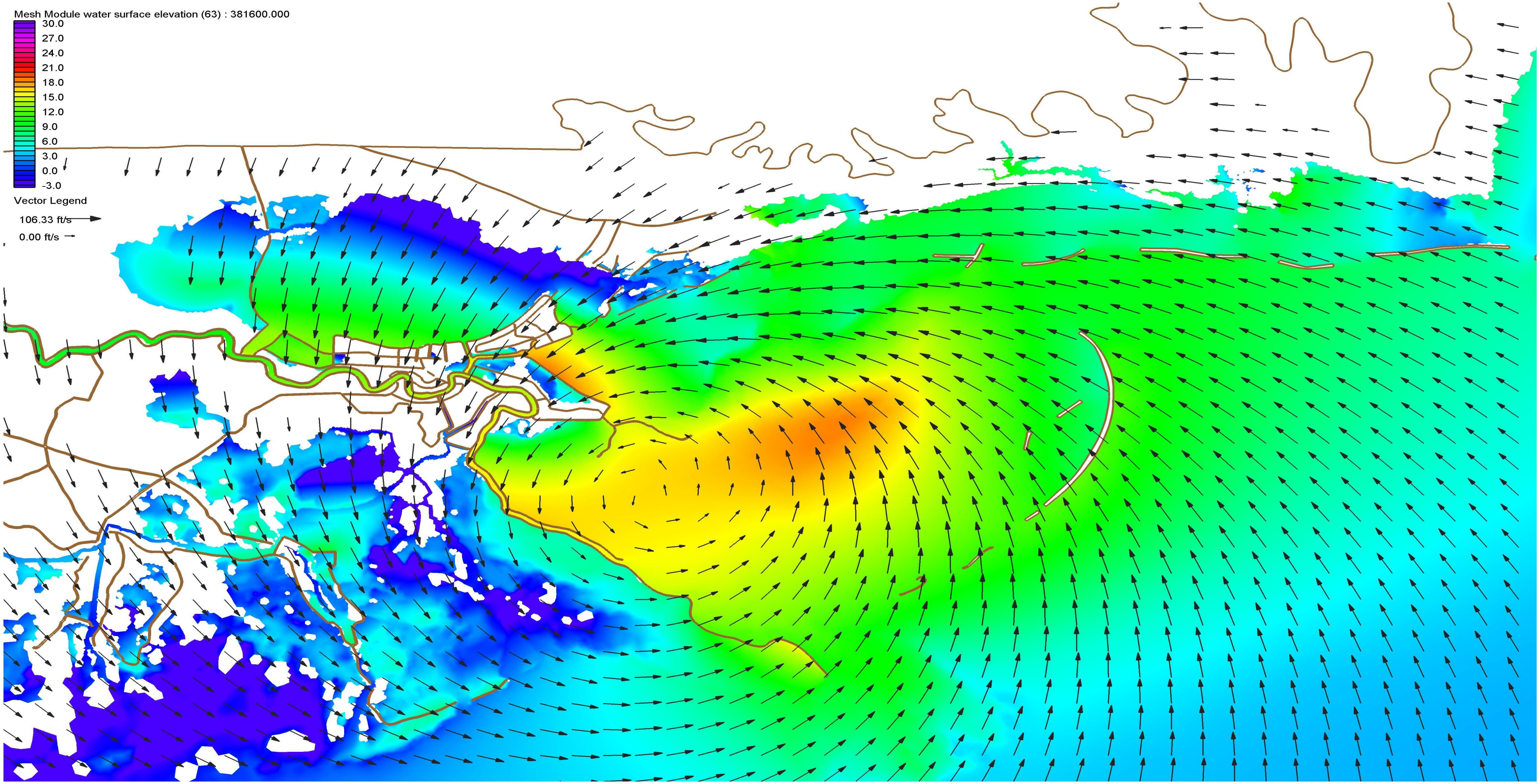
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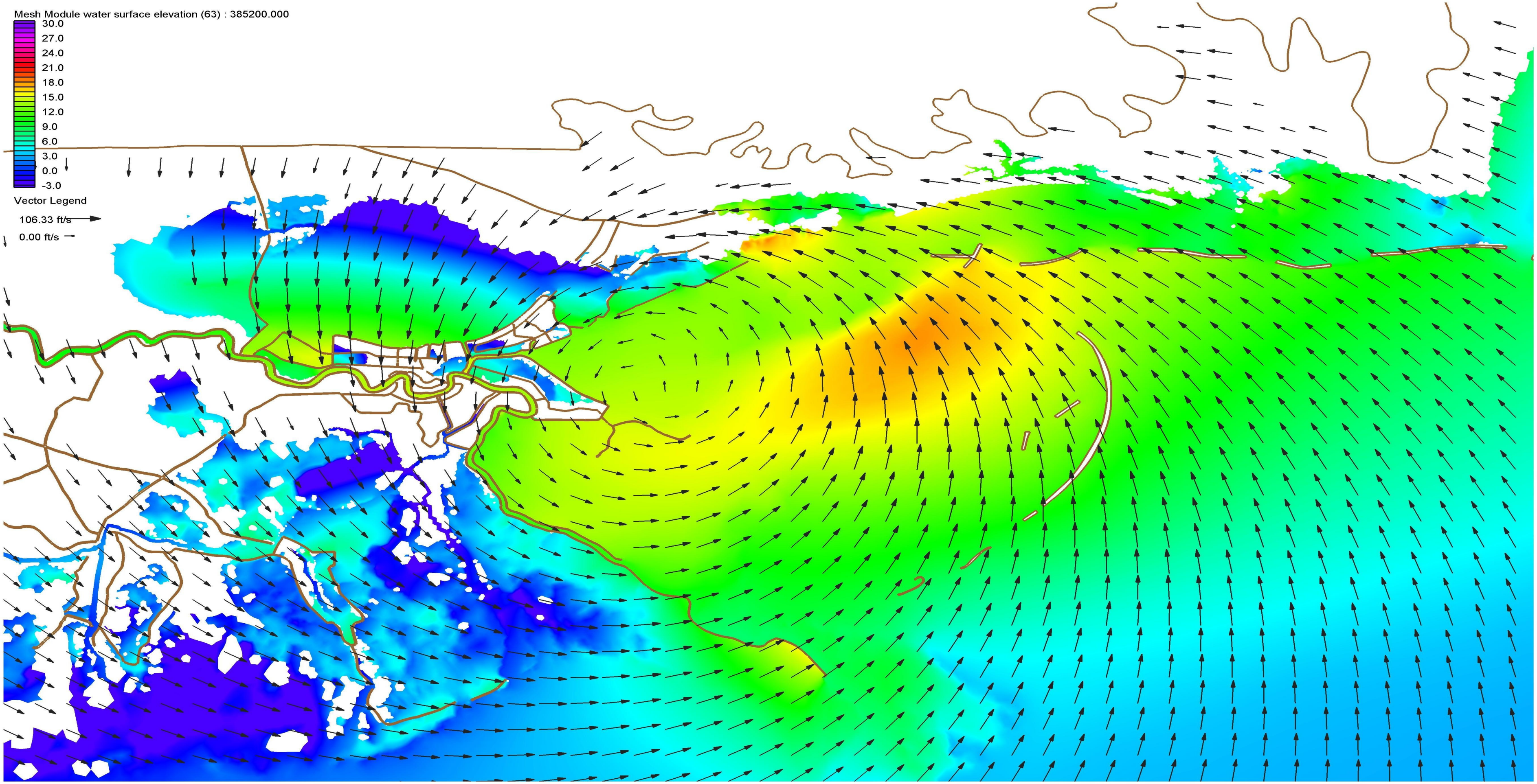
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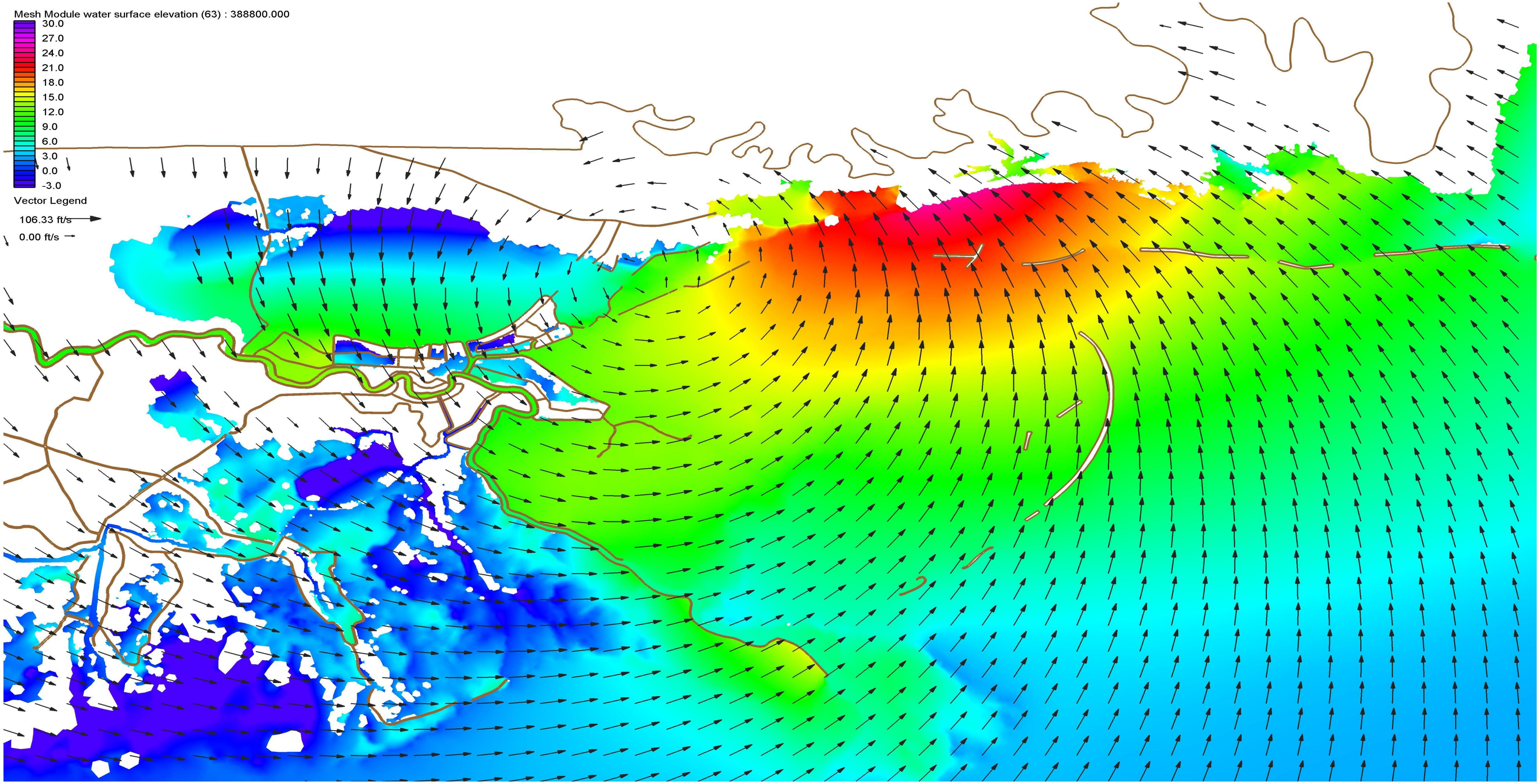
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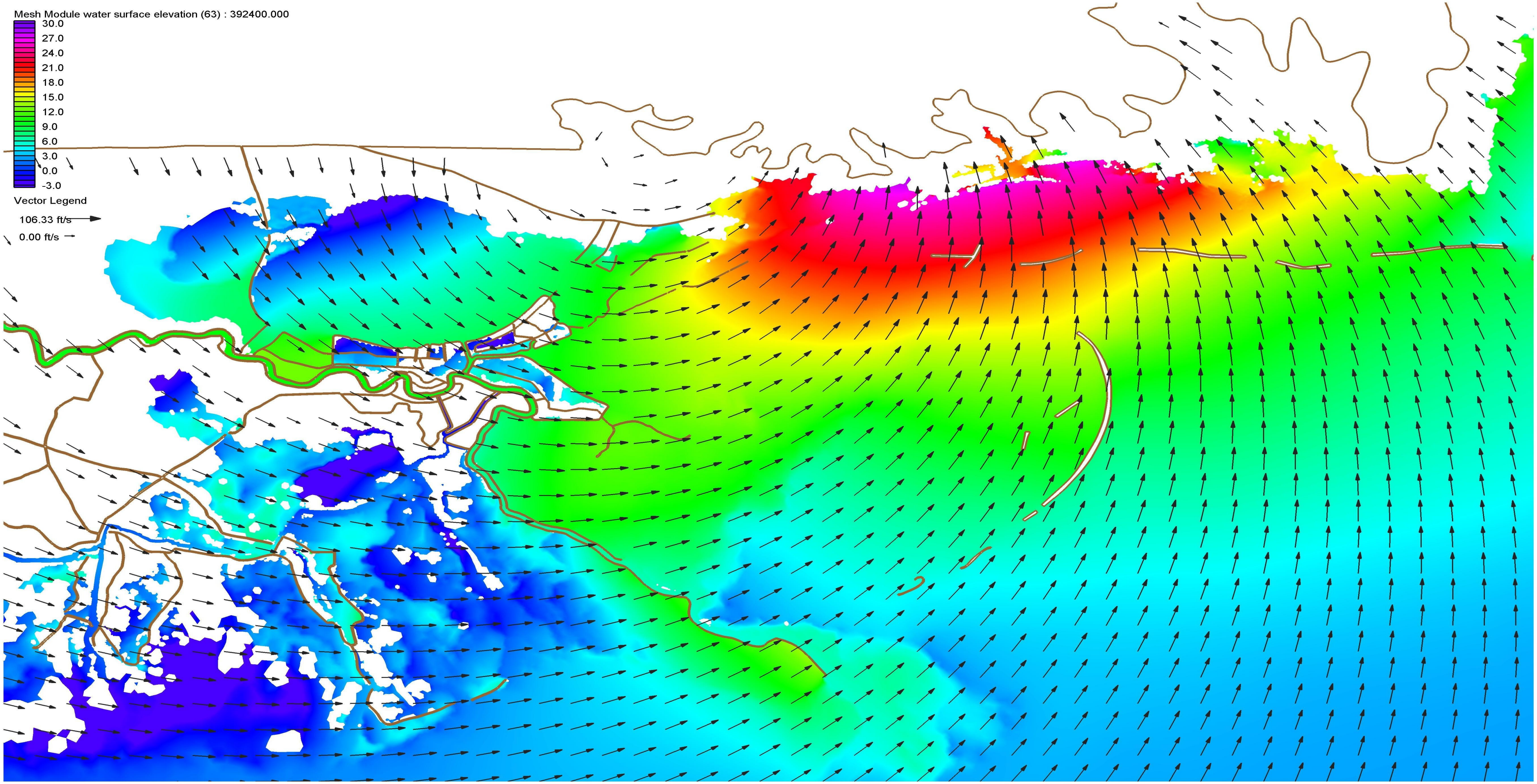
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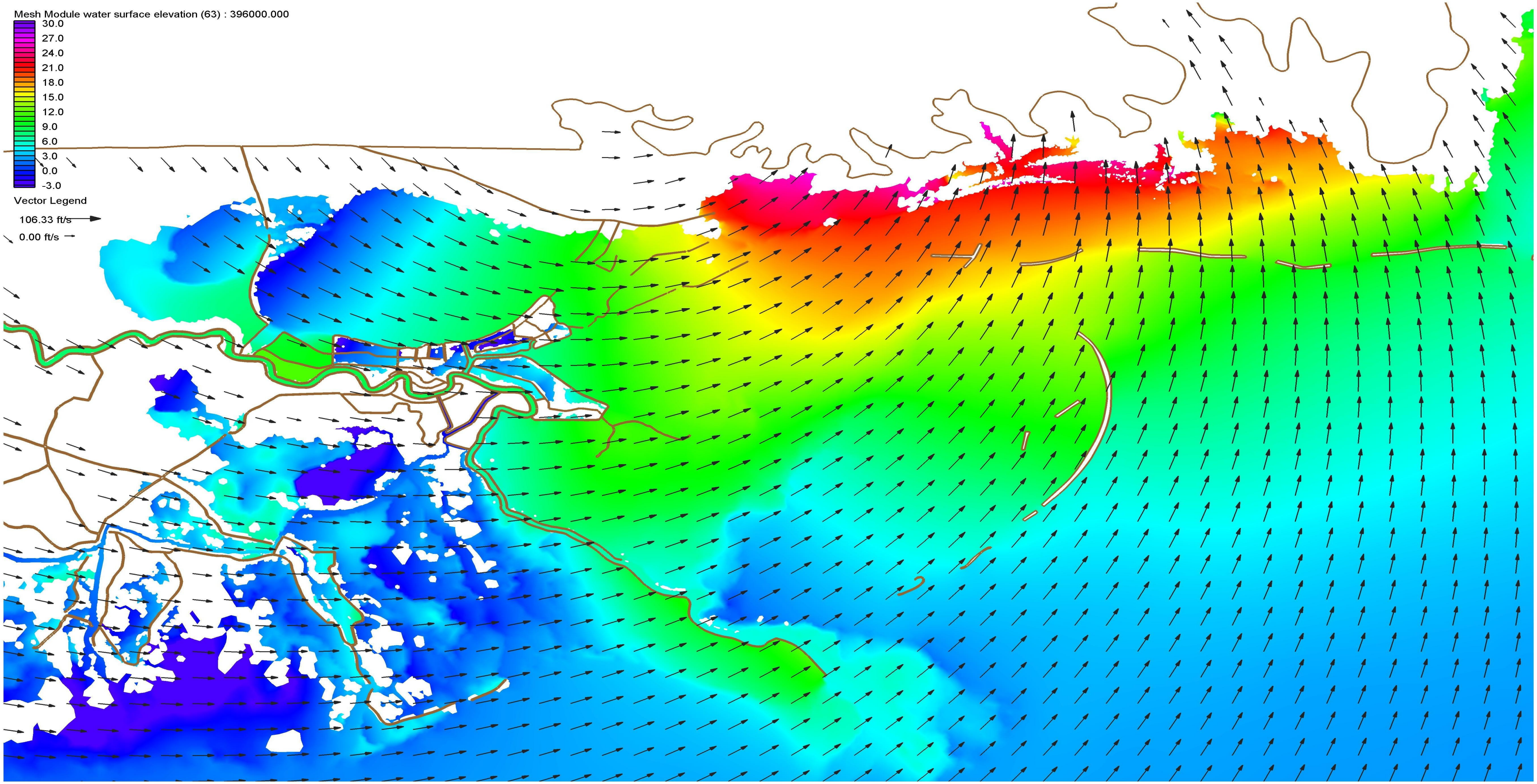
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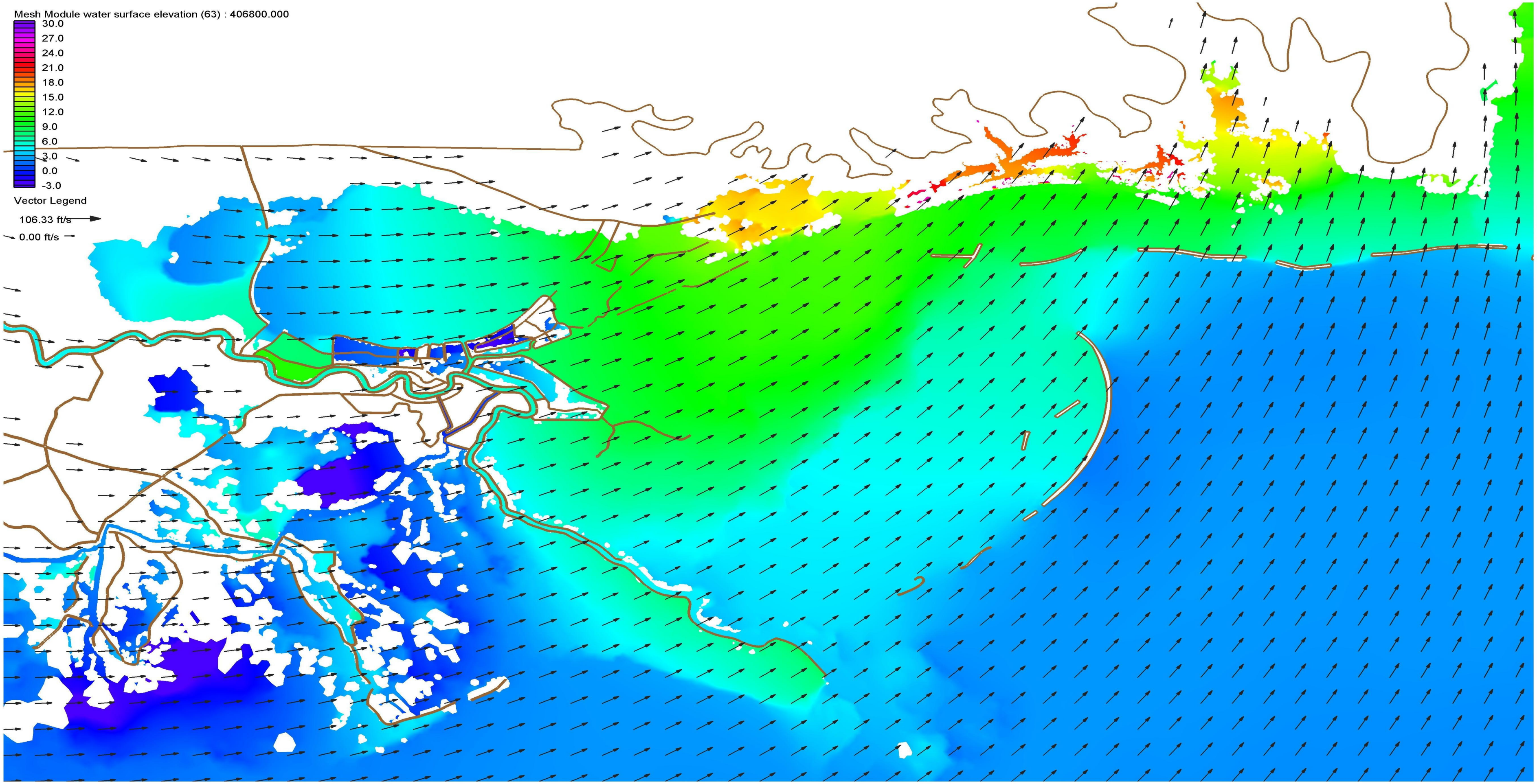
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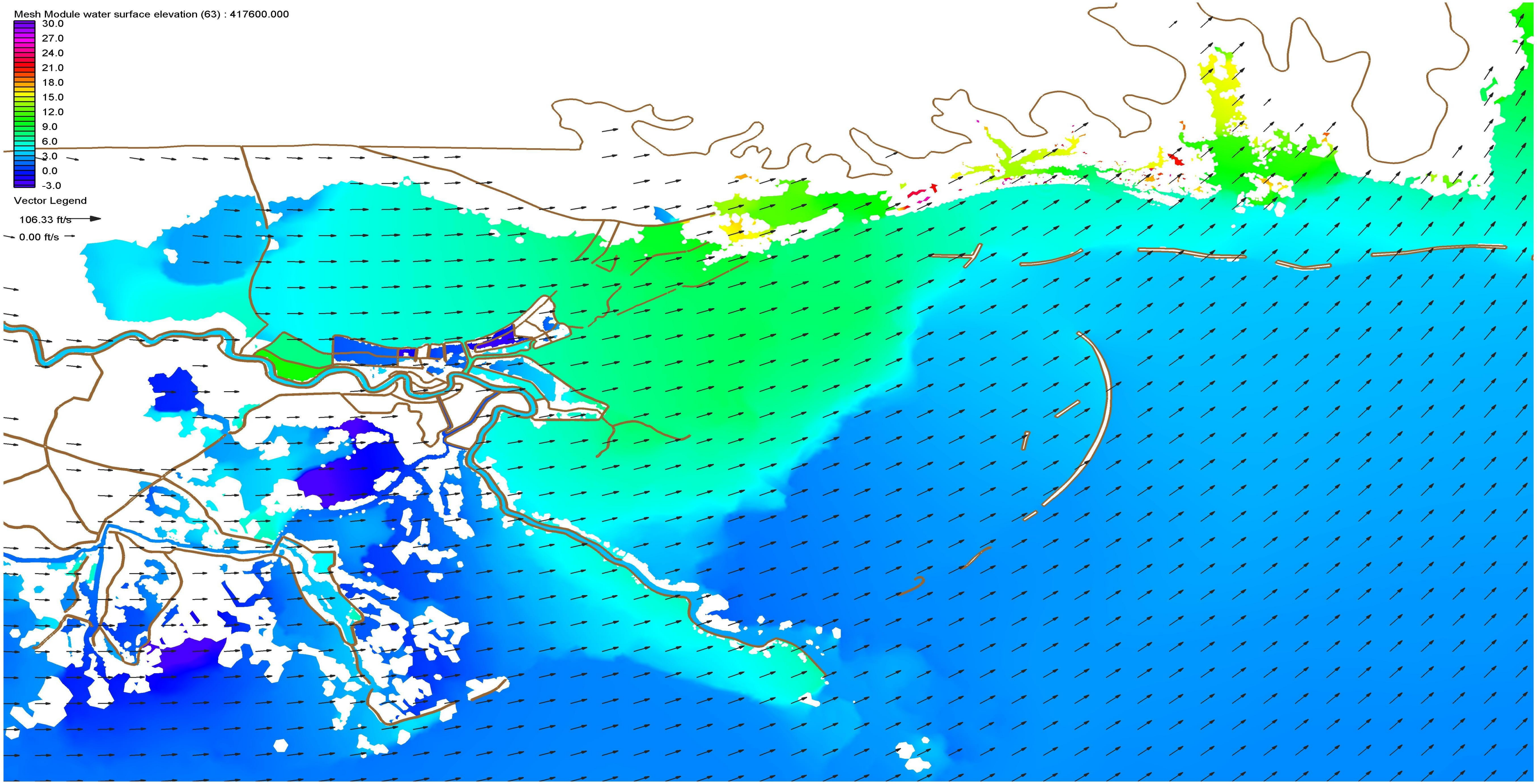
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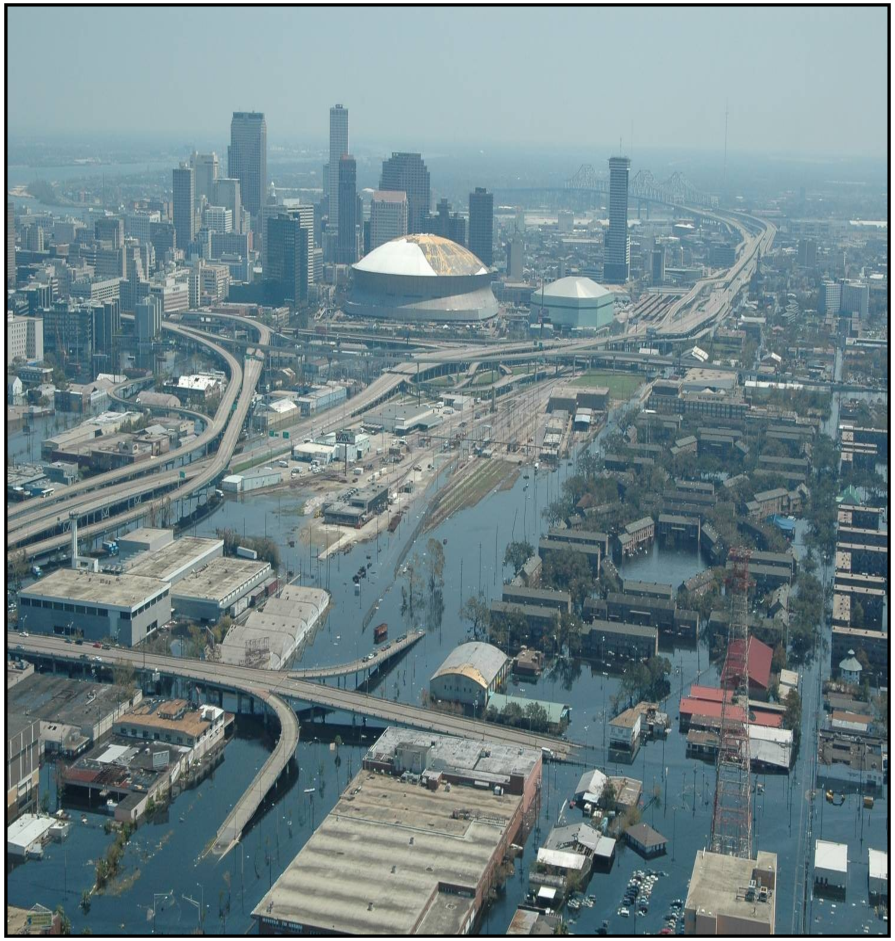
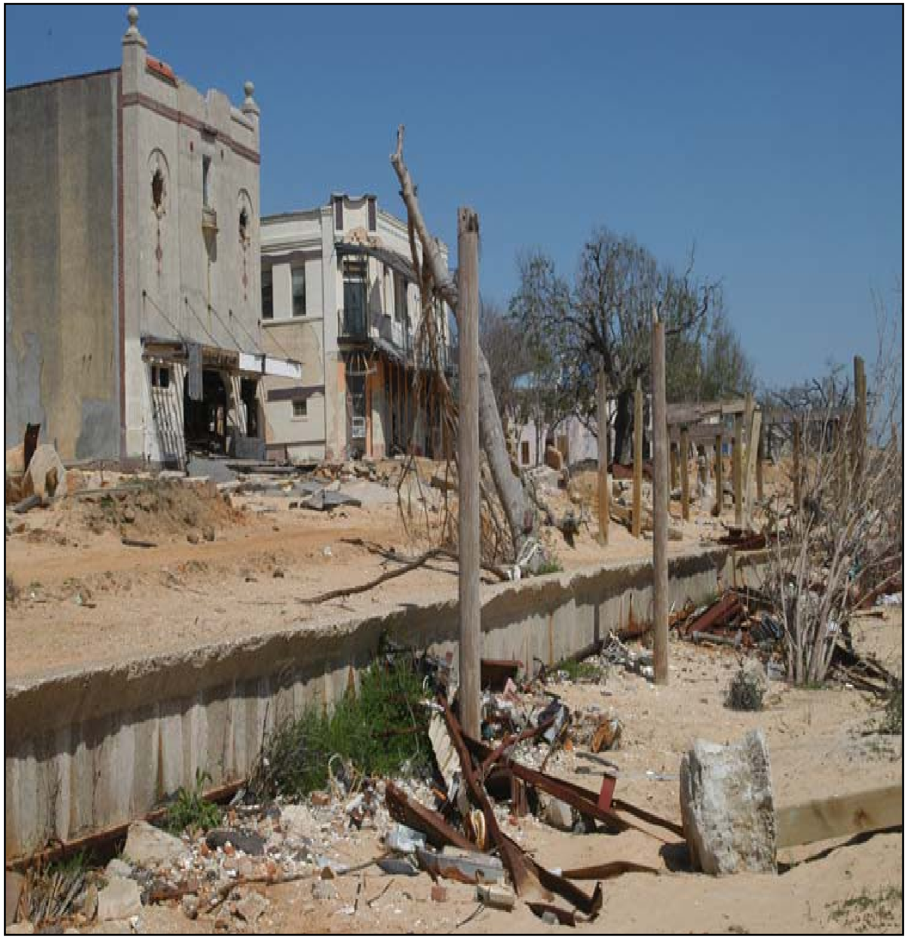


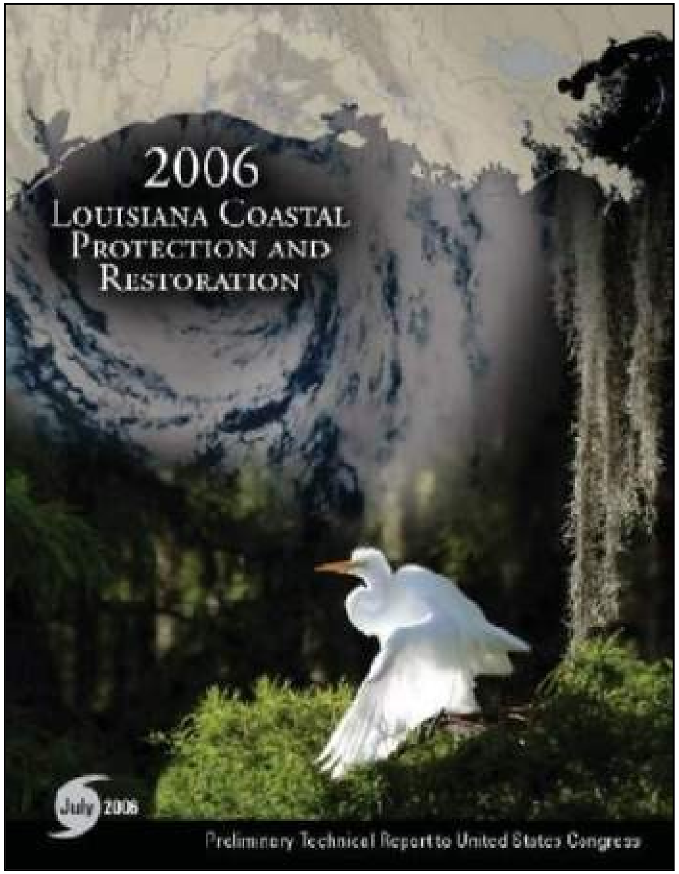
New Orleans, Louisiana



Bay St. Louis, Mississippi

# LaCPR Congressional Direction

- Comprehensive hurricane protection analysis and design
- Full range of flood control, coastal restoration, and hurricane protection measures
- Storm surge equivalent to a “Cat 5” hurricane
- Exclusive of normal policy considerations
- Reports on component areas for authorization as soon as practicable
- Close Collaboration with state of Louisiana
- Mississippi River Gulf Outlet (MRGO) – LaCPR spin off to de-authorize MRGO



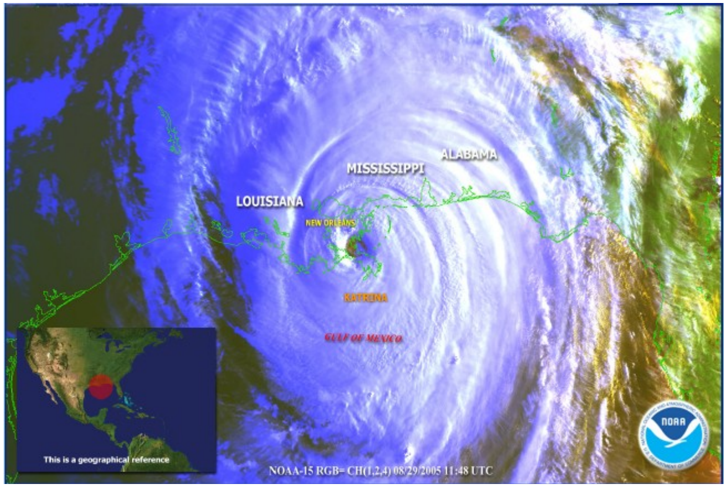
2006
LOUISIANA COASTAL PROTECTION AND RESTORATION

July 2006

Preliminary Technical Report to United States Congress

# MsCIP Congressional Direction

- Comprehensive Plan to Address
  - Hurricane and Storm Damage Reduction
  - Salt Water Intrusion
  - Shoreline Erosion
  - Fish and Wildlife Preservation
  - Other Water Related Resource Projects
- Cost Effective Projects in lieu of NED benefits
- No Incremental Benefit-Cost Analysis
- 6 month interim and 24 month comprehensive report requirements


LOUISIANA
MISSISSIPPI
ALABAMA
NEW ORLEANS
KATRINA
GULF OF MEXICO
This is a geographical reference
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Studies related to the consequences of the 2005 hurricanes

# Approaching LaCPR and MsCIP
# from a
# Systems Perspective

US Army Corps of Engineers®

MsCIP & LaCPR

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## ① Define the Problems and Objectives

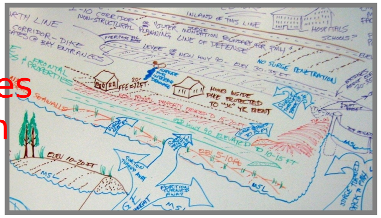
- Public Input
- Site Visits
- Stakeholder Visions

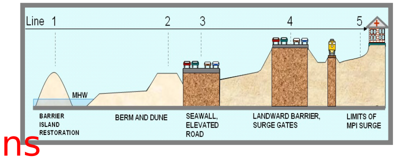
## ② Gather Data to Define the Existing and Probable Future Conditions

- Aerial Photos
- Surveys
- Soil Borings
- Structure Inventory

## ③ Formulate Alternative Pla

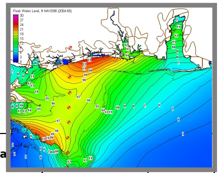
- Create Measures that accomplish Objectives
- Combine to form Plans
- Reformulate Alternative Plans to make more effective



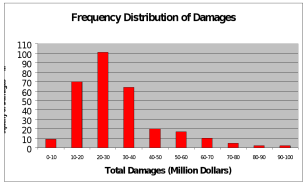


## ④ Evaluate Each Alternative

- Environmental & Economic Benefits
- Social Impacts
- Risk Informed Decision Framework

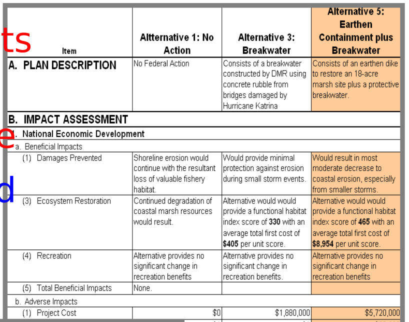


| Spatial Da Layer | | |
|---|---|---|
| Hydric Soils | Hydric | 5 |
| | Non-Hydric | 0 |
| Wetness Index | 15 to >20 | 5 |
| | 7 to 15 | 3 |
| | 0 to 7 | 1 |
| | < 0 | 0 |
| Damaged Structures Area | Catastrophic Damage | 5 |
| | Extensive Damage | 3 |
| | Moderate Damage | 1 |

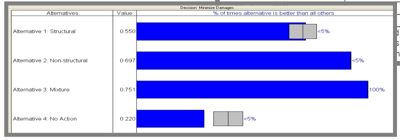


## ⑤ Compare the Plans

- Look at effects across plans
- Cost Effective
- Risk Informed Decision Framework



| Item | Altternative 1: No Action | Alternative 3: Breakwater | Alternative 5: Earthen Containment plus Breakwater |
|---|---|---|---|
| A. PLAN DESCRIPTION | No Federal Action | Consists of a breakwater constructed by DMR using concrete rubble from bridges damaged by Hurricane Katrina | Consists of an earthen dike to restore an 18-acre marsh site plus a protective breakwater. |
| B. IMPACT ASSESSMENT | | | |
| 1. National Economic Development | | | |
| a. Beneficial Impacts | | | |
| (1) Damages Prevented | Shoreline erosion would continue with the resultant loss of valuable fishery habitat. | Would provide minimal protection against erosion during small storm events. | Would result in most moderate decrease to coastal erosion, especially from smaller storms. |
| (3) Ecosystem Restoration | Continued degradation of coastal marsh resources would result. | Alternative would would provide a functional habitat index score of **330** with an average total first cost of **$405** per unit score. | Alternative would would provide a functional habitat index score of **465** with an average total first cost of **$8,954** per unit score. |
| (4) Recreation | Alternative provides no significant change in recreation benefits | Alternative provides no significant change in recreation benefits. | Alternative provides no significant change in recreation benefits |
| (5) Total Beneficial Impacts | None. | | |
| b. Adverse Impacts | | | |
| (1) Project Cost | $0 | $1,880,000 | $5,720,000 |
| | $0 | $0 | $89,600 |
| | $0 | $148,800 | $542,100 |
| | d result in s to ic Benefits | Alternative would result in minimal decreased coastal erosion and resulting | Alternative would result in moderate decreased coastal erosion and |

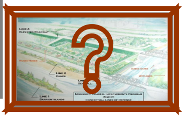


Decision: Minimize Damages

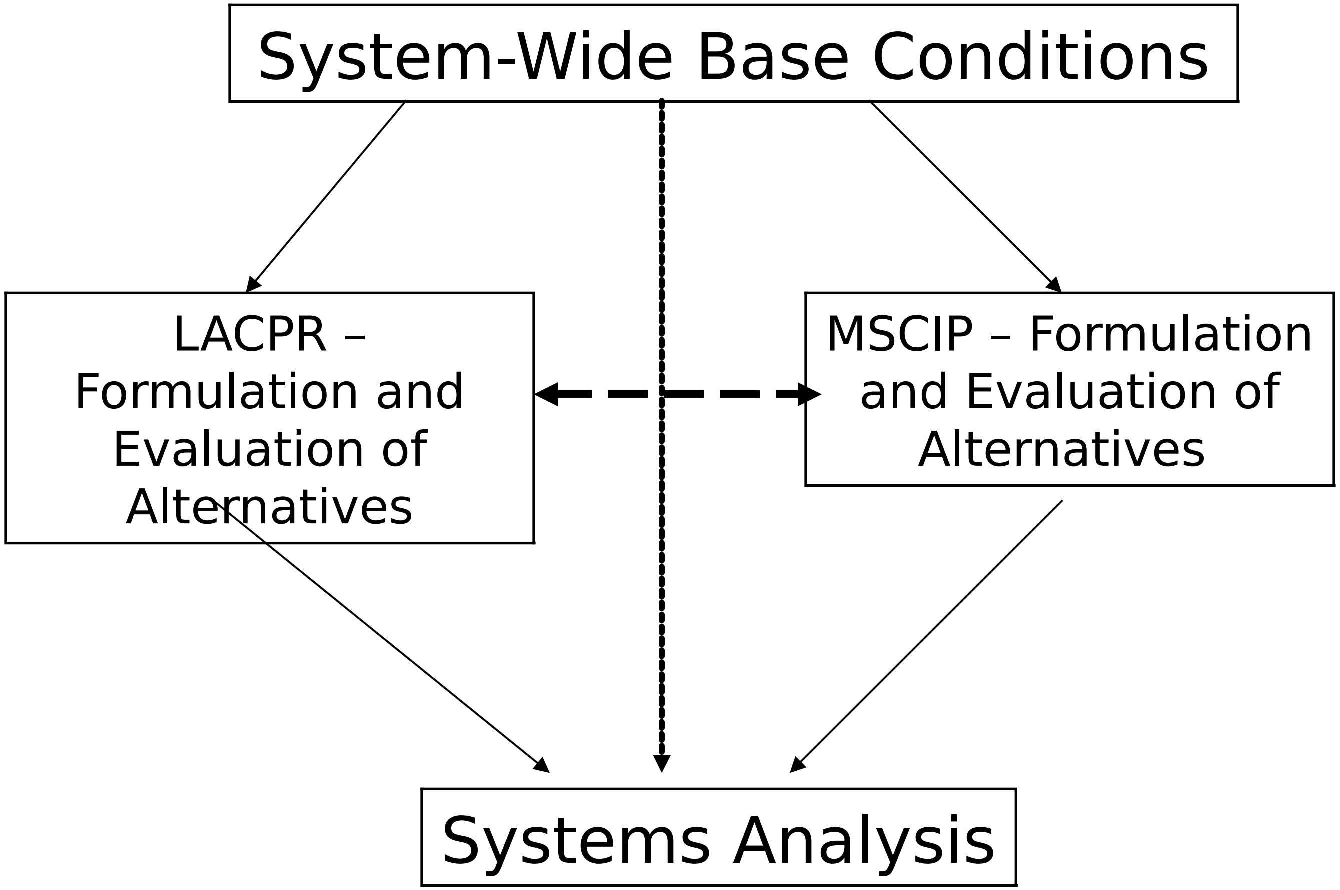
| Alternatives | Value | % of times alternative is better than all others |
|---|---|---|
| Alternative 1: Structural | 0.550 | <5% |
| Alternative 2: Non-structural | 0.697 | <5% |
| Alternative 3: Mixture | 0.751 | 100% |
| Alternative 4: No Action | 0.220 | <5% |

## ⑥ Select Best Plan(s) to Reduce Risk

- Study Team Findings
- Public / Agency Reviews
- Congress Makes



# Approaching LaCPR and MsCIP from a Systems Perspective



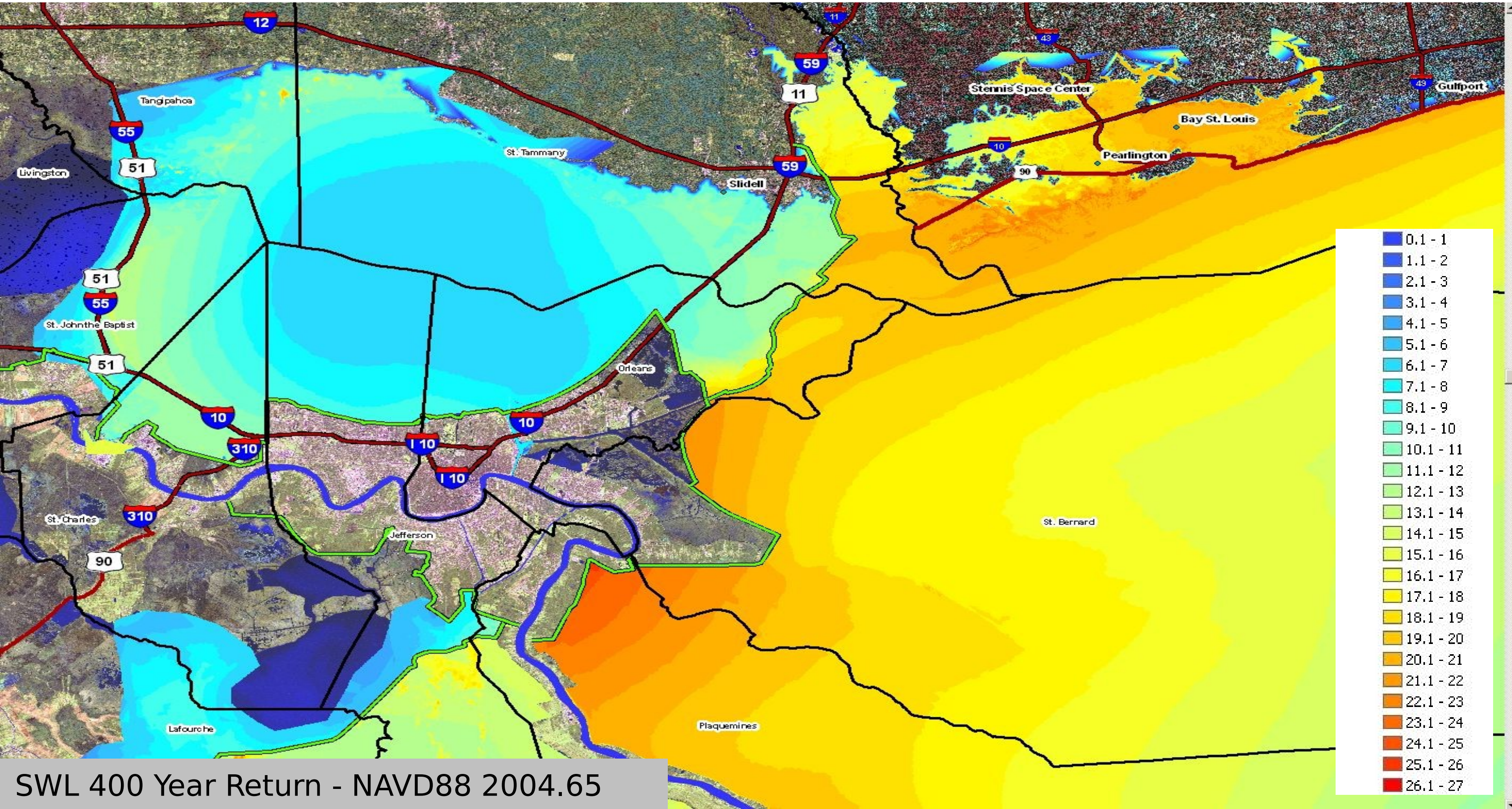
System-Wide Base Conditions

LACPR – Formulation and Evaluation of Alternatives

MSCIP – Formulation and Evaluation of Alternatives

Systems Analysis

# Example: LaCPR EB Barrier Conditions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310
Jefferson
St. Bernard
90
Lafourche
Plaquemines
0.1 - 1
1.1 - 2
2.1 - 3
3.1 - 4
4.1 - 5
5.1 - 6
6.1 - 7
7.1 - 8
8.1 - 9
9.1 - 10
10.1 - 11
11.1 - 12
12.1 - 13
13.1 - 14
14.1 - 15
15.1 - 16
16.1 - 17
17.1 - 18
18.1 - 19
19.1 - 20
20.1 - 21
21.1 - 22
22.1 - 23
23.1 - 24
24.1 - 25
25.1 - 26
26.1 - 27

SWL 400 Year Return - NAVD88 2004.65

# LaCPR Current Status

- Draft Technical Report Under External Peer Review by NAS
  - Describes the storm threats facing coastal Louisiana.
  - Describes alternative combinations of coastal, non-structural, and structural measures that could be implemented to reduce these threats.
  - Evaluation of these alternative plans using metrics.
  - Describes of tradeoffs between these different alternative plans.
  - Initial stakeholder metric weights
  - Ranked plans using
    - Performance against LACPR objectives
    - Multi-Criteria Decision Analysis (MCDA)
    - Legislative directive Category 5 hurricanes
- Completing Systems Analysis

# MsCIP Current Status

**Fifteen Interim Projects**

- Fully funded
    - Engineering and Design
- Summary Statistics
    - Restore 35 miles of beach and dune habitat
    - Protect/enhance 3300 acres of coastal wetlands
    - Restore 2 ½ miles of seawall systems
    - Restore flood storage capacity and circulation in 11miles of streams/canals
    - Potential reduction in storm damage to over 41,000 structures
    - Provide $11 million in annual recreation benefits

Bay St. Louis - South Beach Blvd - BEFORE

Bay St. Louis - South Beach Blvd - AFTER

# MSCIP Current Status

- Draft Comprehensive Report Under Policy Review by Headquarters
  - Describes the storm threats facing coastal Mississippi.
  - Describes alternative combinations of coastal, non-structural, and structural measures that could be implemented to reduce these threats.
  - Evaluation of these alternative plans using metrics.
  - Describes of tradeoffs between these different alternative plans.
  - Initial stakeholder metric weights
  - Near term and long term recommendations
- Completing Systems Analysis

# Challenges

- Multiple purpose, multiple objective
- Risk-based regional integrated systems impact analysis
- Multiple future scenarios for evaluation
- Complex evaluation criteria/considerations
- Modeling needs to assist in formulation

# Questions?